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FOR THE YEAR
1892.

THE AMERICAN AGRICULTURIST

FOR THE

FARM GARDEN & HOUSEHOLD

"AGRICULTURE IS THE MOST HEALTHFUL, MOST USEFUL, AND THE MOST NOBLE EMPLOYMENT OF MAN"
WASHINGTON

NEW YORK.

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AMERICAN AGRICULTURIST

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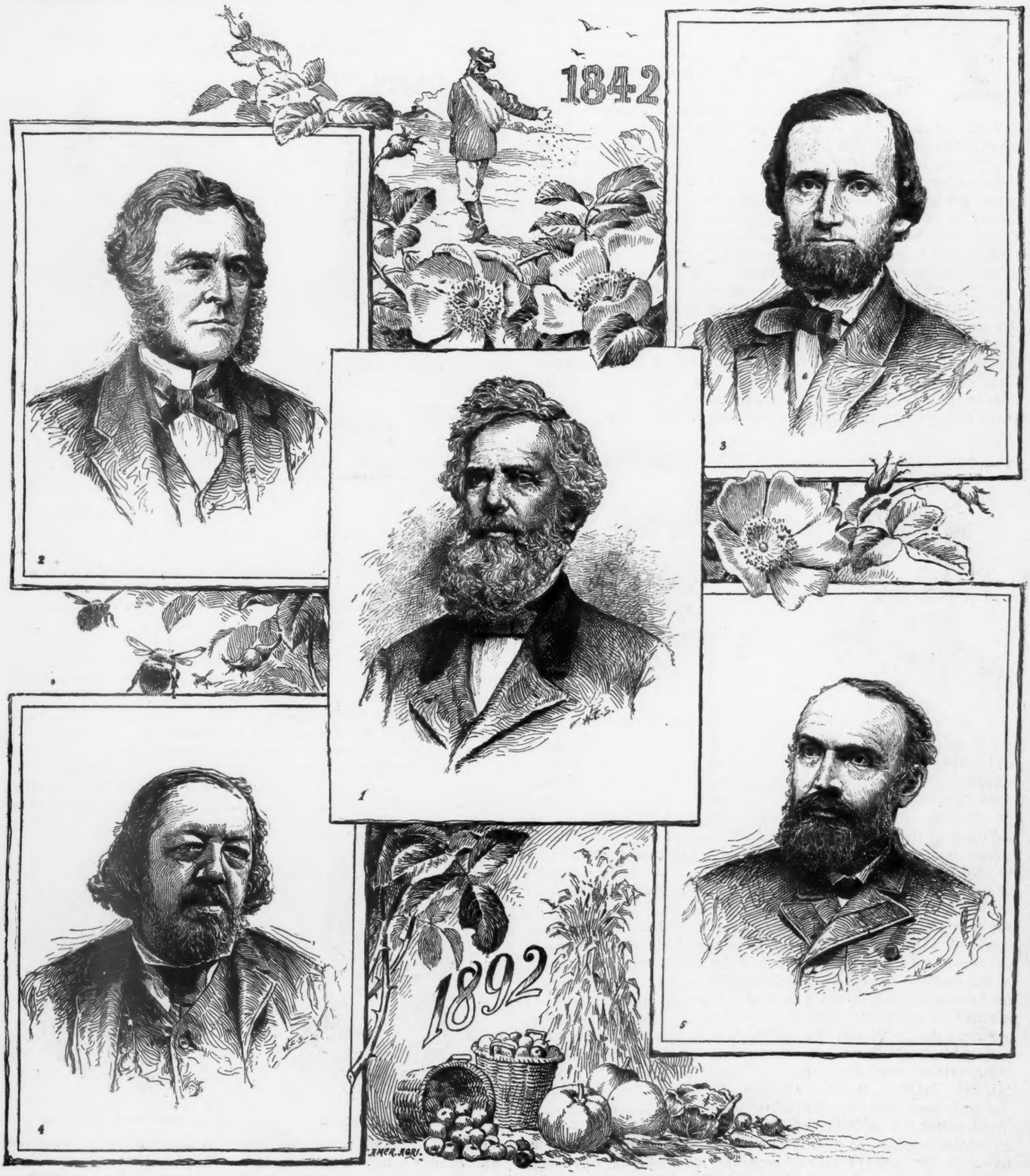

1842. THE EDITORS OF THE AMERICAN AGRICULTURIST. 1892.

1. A. B. Allen. 2. R. L. Allen. 3. Orange Judd. 4. Dr. Geo. Thurber. 5. Dr. F. M. Hexamer.

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THE SEMI-CENTENNIAL OF THE AMERICAN AGRICULURIST.

HEARTY greeting is sent forth to the legions of friends of the AMERICAN AGRICULTURIST on the occasion of its Semi-Centennial Anniversary. Fifty years is a long time to look back in one's life; still more so in the career of a great national magazine of the character and scope of the AMERICAN AGRICULTURIST. It represents a period of nearly one-half of our national existence, and one-eighth since the discovery of America. When the first number of this periodical appeared, agricultural journalism was in its infancy; barely more than an experiment. Although several agricultural papers had been published prior to that time, but few of them survived the difficulties which then confronted publishers of agricultural literature. It required more than ordinary courage to embark into a venture of this kind, but Mr. A. B. Allen, founder of the AMERICAN AGRICULTURIST, then in the prime of manhood, proved himself fully equal to the undertaking, and together with his brother, Richard L. Allen, commenced the publication of the AMERICAN AGRICULTURIST, in the year 1842. Mr. A. B. Allen is still living, and, at the venerable age of ninety years, takes pride in contributing an article to this number of the magazine which he founded a half century ago.

The first ten volumes were of octavo size, each monthly issue containing about thirty-two pages. As a record of the agricultural conditions of these years and the awakening of the intense interest in agricultural improvement, the value of these early volumes can hardly be overestimated. Mr. Lewis F. Allen,

REV. WM. CLIFT.

COL. M. C. WELD.

editor of the American Shorthorn Herd Book, whose biography and portrait were published in the AMERICAN AGRICULTURIST of 1888, was, during these years, closely associated with his brothers in their work.

With the eleventh volume the pages of the AGRICULTURIST were enlarged to their present size, and for four years it was published weekly, under the joint supervision of A. B. Allen and Orange Judd. In 1856 Mr. Orange Judd bought the good-will and entire property of the AMERICAN AGRICULTURIST, thus becoming sole proprietor and editor. The monthly form was resumed as being best adapted to the wants of the largest number of readers. Mr. Judd was well prepared for the work, having had some practical farm training and the benefits of a three years' course in the Agricultural Department of Yale college, but the principal factor in his successful career was his keen perception of the wants of the people and the variety of means he employed to attract their attention. He possessed, also, a remarkable faculty of drawing to his assistance the best talent obtainable, and those who were acknowledged authorities in their various specialties. Rev. William Clift, whose "Timothy Bunker Papers" were for some time a leading feature of the periodical, was one of his first associates. In 1861, Mr. M. C. Weld, editor and publisher of the *Connecticut Homestead*, became an associate editor. A year later he entered the army, but, after an honorable discharge of his regiment, and his promotion to colonel, he resumed editorial connection with the AGRICULTURIST. His thorough knowledge of practical and scientific agriculture, and especially livestock matters, combined with his conscientious work, became at once apparent in an increasing usefulness of the magazine. From that time Colonel Weld remained a regular contributor to within a few weeks of his death, in 1887. During Colonel Weld's absence, in 1863, Dr. George Thurber, then Professor of Botany and Horticulture in the Michigan Agricultural College, was called to the editorial chair. His vast fund of exact knowledge of botany, chemistry, and natural sciences in general, made him remarkably well fitted for his new work, and it was from that time on that the AMERICAN AGRICULTURIST became everywhere recognized as authority in all branches of scientific and practical agriculture and horticulture—a proud distinction which it has steadily maintained to the present day.

On the absorption of the *Genesee Farmer*, in 1866, Joseph Harris, its former editor, and author of the famous "Walks and Talks,"

JOSEPH HARRIS.

HENRY STEWART.

joined the editorial staff. A few years afterward Henry Stewart became associate editor, and, still later, Dr. B. D. Halsted. All these gentlemen are still regular contributors, and have furnished articles for this number. In 1885 Dr. George Thurber, owing to failing health, retired from his editorial position, and was succeeded by Dr. F. M. Hexamer, who still occupies this post, with George A. Martin as his associate.

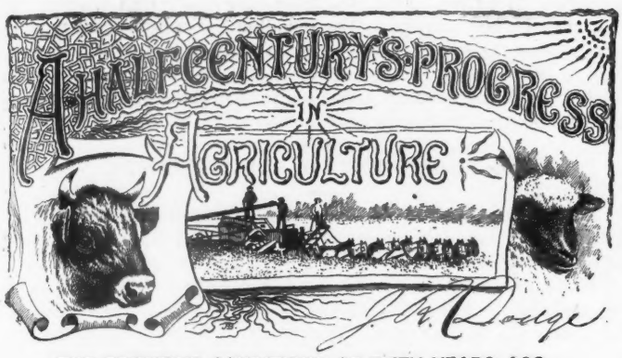
In 1883 Mr. D. W. Judd superseded his brother as president of the Orange Judd Company, and after the death of the former, in 1888, a controlling interest of the company was bought by its present owners, with Mr. Edward H. Phelps as President. On the retirement of Mr. Phelps from active participation in the business, the management devolved upon Mr. Herbert Myrick, President, and Mr. George S. Graves, Treasurer and Business Manager. The course of the AMERICAN AGRCULTURIST under its present management has been one of continuous improvement and progress in every department. While the fundamental principles laid down by its founders, and to which a great measure of its success is due, have been firmly maintained, new features have been added from time to time, in accordance with the changed agricultural conditions and the requirements of modern life and methods.

In all the world's history, agricultural science has not made greater progress than in the past fifty years, and especially during the present generation. Taking the past ratio of progress as a

DR. B. D. HALSTED.

GEORGE A. MARTIN.

guide, the human mind can hardly realize the possibilities the future may bring in this direction. Whatever these achievements may be, the AMERICAN AGRICULTURIST will always be found a true exponent of the progressive spirit of the age. It begins its second half century with the brightest prospects; better equipped in every respect than it has ever been before to carry on its great work.



THE PRIMITIVE CONDITIONS OF FIFTY YEARS AGO.

Half a century ago, when the national government had been in existence fifty years, the young nation, which started with four million people, boasted a population of seventeen millions, of whom a large proportion must have derived their support directly from agriculture. The factory system was in process of organization, domestic manufacture was fast declining towards desuetude, mining was in its infancy, and agriculture dominated the productive industries. Nine-tenths of the South was in forest, the prairies of the West were dotted with homesteads here and there, the plains beyond the Missouri were the homes of countless herds of bison, and the wild Indian hunted and fought through most of the western half of the continent.

The farmer of those days dressed in homespun, or in the coarse and dear fabrics of the few rough looms so recently started in the new factories. His furniture was generally of the plainest, meager in variety, the clumsy workmanship of the local cabinetmaker, or the result of his own unskilled labor. His wife baked in the Dutch oven, boiled in the iron kettles hanging on the crane, and fried in the long-handled pans in the broad open fireplace, throughout the broad acres away from the few cities of the older States; while in the region of factory development the rough stoves of early invention were scarce and dear, but beginning to be used in families of some means and enterprise. All material for clothing was high in price and limited in variety. Twenty years earlier calicoes were retailed at fifty cents per yard; already that value had been reduced one-half or more, yet they were still sold at two or three times their present price. The clothing now used by the farmers' wife and children could not then have been obtained at any cost.

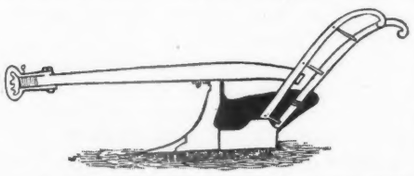


FIG. 1. JETHRO'S WOOD PLOW, INVENTED 1819.

Present social and educational facilities required by farmers, the furnishing and adornment of their houses, the equipment in horses and carriages and other comforts of life, such as are now common to the best class of farmers, were scarcely dreamed of in 1840, and are such as are not attainable in our cities, except by those of relatively large income. In newer settlements, in distant States, there are multitudes of humbler aspirations and smaller means of gratification, but everywhere the style of living has immeasurably advanced during the past fifty years.

AGRICULTURAL IMPLEMENTS OF THE "GOOD OLD TIMES."

In farm implements there was an equal dearth. The plow has been used from time immemorial, whether a crooked stick or ponderous steam machine. It was comparatively a rude implement fifty years ago. To be sure it was the subject of study of scientific Americans a hundred years ago, and Thomas Jefferson wrote a treatise upon the requisite form of the mold-board and the curvature to insure the least friction, yet improvement was very slow.

Charles Newbold, of New Jersey, in 1797, had obtained a patent for a cast-iron plow, with mold-board and share and land-side all cast together, and other inventors made improvements later. These plows were heavy of draft, hard to hold, and for deep cultivation required a man on the beam to hold them down. Prejudice and conservatism still clung to the old wooden plow, asserting that the new iron plow poisoned the land.

Fifty years ago, however, the new plows had begun to force their way into general use in the East, while in the West and South the village blacksmith was still very generally the plow maker, and the simple implement was a rough combination of wood and iron of various shapes and forms. At this time the mower and reaper were in process of evolution. A few years previously Obed Hussey, of Cincinnati, and McCormick, of Virginia, had obtained patents and were introducing their inventions. The New York State Agricultural Society held a mower and reaper trial in Buffalo in 1848, which scarcely convinced the farmers of the superiority of mowers over scythes, and in 1852 twelve machines were exhibited by the State Board of Agriculture in Ohio.

As late as 1860 the farmers of New England held that most of their farms were quite too rough for mower or reaper. Now very little haying is done there with the scythe, and practically no harvesting of grain with the sickle. Haying is now a pastime on those rough farms, the old rake having given place to the great horse rake, and in many places the hay-loader does the straining work of the pitcher. On one of those rocky farms, the past summer, the writer knew a slender girl of thirteen to rake and put in windrows six acres of hay in a few hours. In the smooth fields of the West it is easy to gather the hay of twenty to thirty acres with a single machine.

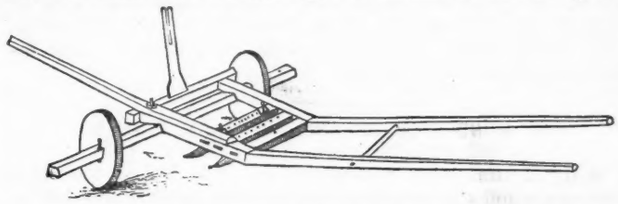


FIG. 2. JOHN B. SMITH'S CULTIVATOR, INVENTED 1839.

The perfecting of the American reaper has been one of the great triumphs of invention. A sharp competition of many manufacturers, each with a force of inventors and draughtsmen and pattern makers, has rendered the selection of the best machine an almost hopeless undertaking, where all are so good that every purchaser insists that he has the best. Raking attachments were followed by self-binders, which soon monopolized the field. They have gone to all parts of the world, and have overcome all opposition, having obtained in 1890 a sale for foreign markets of $2,092,638 in a single year.

Eighteen years ago the writer witnessed a trial in the Danube Valley in Austria, in which a dozen or more machines participated, all from the United States, except four—two from England and two from Germany. It was a severe test in a perfect forest of stiff rye, in which the German machines broke down, and the English "lagged superfluous," while the American went through like a whirlwind. These reapers at the present time surpass all others for lightness and perfect adaptation to the work required, lightness of draught and ease of handling. They are constantly becoming cheaper, but whether cheap or dear, they make their way through the world by sheer superiority over all others. The exportation of agricultural implements reached the aggregate value of $3,859,184, in 1890. There is neither space nor necessity for attempted description in detail of the advance in invention, skill in manufacture, or labor saving in use, of the agricultural implements of the present day, nearly all the result of the last half century's progress. They have eliminated most of the drudgery of the farm, reduced the hours of labor, and increased immensely the effectiveness and capacity for production of its available resources and labor. [Some of the principal improvements are illustrated in the accompanying engravings, Fig. 1 to Fig. 12.]

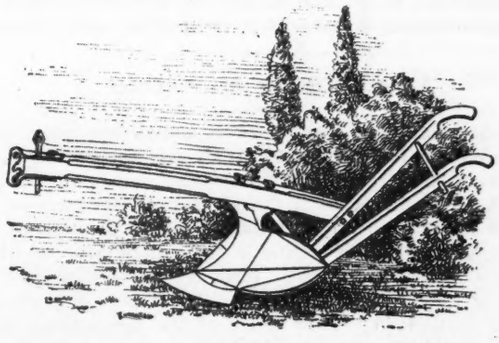


FIG. 3. COLTER ATTACHMENT, INVENTED 1834.

THE WAGES AND TREATMENT OF FARM LABOR.

The laborer has always resisted the introduction of labor-saving machines at the outset, sometimes to the destruction of the offending innovations, fearing that the demand for his service may decline and wages fall. It is ever a futile opposition and a foolish fear, as the result is always an increase of demand and production, the elevation of labor and increase of wages. Fifty years ago the wages of farm hands employed by the year ranged from $8 to $10 per month, rarely $12 in regions of unusual demand.

The range for labor is now from $20 to $30 per month, in extreme cases somewhat higher. Last year, in the midst of depression, the average wages of New England was $26.64 per month, of the Middle States, $23.62, of the Western States, $22. It has been very steady for years. It was lowest in 1879, when all prices were very low. The labor of colored men has also advanced as it has become more intelligent. The farm labor of the Southern States averaged $14.77 last year. It is a common complaint of farmers that labor is too high. As the burden of rural drudgery is relieved, the proprietor is inclined to take things easier, as he should do, if he can afford it, giving himself more time for reading, study, management, and social duties and privileges. And the laborer is also worthy of his hire.

THE WONDERFUL ADVANCE OF FARM VALUES.

In the Central West, throughout the Ohio Valley, the farms which cost a dollar or two per acre fifty years ago, are now held at $40, $50, and $60 or more per acre, improved with commodious and substantial buildings, furnished with convenient and often elegant furniture, carpets, sewing machines, libraries, and musical instruments. There are indeed poorer establishments, occupied by younger or less enterprising farmers, but improvement has been general if not universal.

Beyond the Mississippi are newer lands, more recent improvements, made by men who went into that region with scarcely more than willing hands and stout hearts, and their investments have virtually been created with hard and patient labor. In the enthusiasm of success assured by strong will and stout muscles, they have borrowed money from friends in the older States, or from banks; and they are paying up their indebtedness rapidly in this season of abundant crops and good prices. But the mortgage record remains, even though nine-tenths of the debt may have been already repaid; and yet demagogues quote the entire amount as the burden that is crushing the energy and life of the young farmer.

A reliable and successful farmer of the West declares that he can purchase a farm of one hundred acres at $100 per acre and pay its cost with the profits of its cultivation in five years. I know a farmer in the Valley of the Aroostook, in Maine, in the latitude of Quebec, who bought a farm for $7,500, paying one-third down, and two instalments of $2,500 each in two years from the product of his labor, besides making improvements and putting money in bank.

A HALF-CENTURY OF PROGRESS.

Evidences multiply that prove by actual demonstration that common everyday farming in 1891 pays in every part of the country, in the hands of energetic and enterprising men with brains and judgment. A certain class of the population, not farmers alone, cannot be expected to thrive, falling as fast as they can be set on their feet, and failing in whatever they undertake, whether in agriculture, mechanics, or trade. It should not be forgotten, in the language of the Southern rural Solon, that "there is more in the man than in the land." How much of the agricultural distress, and how many farm mortgages should be credited to this class, and eliminated from the present problem of agricultural relief?

While the increase in farm values has been large during the half century, there has been a temporary decline in recent years, which, however, has been arrested, a marked improvement having taken place the present year. The tide has turned, farm lands are good property, and will inevitably advance in value. Nearly two hundred millions of acres have been "entered" at the land offices during the last ten years, including railroad selections. This is more than a tenth of the original public land areas. The land acts, the homestead excepted, have now been repealed, and the remaining acres are held for the actual settler. When all these unoccupied lands are taken there must be increase of values of all farm lands as population increases. Even the hard soils and rough acres of the East will advance in value. The so-called "abandoned farms" are already being taken up for development and for summer residences. Some of the cheapest lands in the country are to be found in the midst of ennobling scenery, pure and invigorating air, good society and close proximity to large cities.

THE DEVELOPMENT OF OUR LIVE STOCK.

The improvement of farm animals, during the past fifty years, has been a marvel of progress. The influence of the thoroughbred has been a transformation that seems little short of creation.

The horse has been developed in symmetry of form, grace of carriage, power of endurance, and adaptation to specific purpose. The trotter has been advanced in speed, year by year, until a mile in 2:40 became the ideal of the trainer, then 2:20, 2:10, and less, and now the hope of the future is to make a mile in even two minutes. Since 1840 a wonderful development in freighters and roadsters has taken place, through the blood of the Percheron, the Norman, and the Cleveland Bay, and other English breeds. The average weight of work horses has been greatly increased, and their efficiency and intrinsic value largely advanced, creating a small foreign demand, which is increasing, tending to strengthen domestic values.

CATTLE, THEIR IMPROVEMENT AND NUMBER.

The scrubs that constituted the farm herds of cattle, whether of original English, Dutch, or Spanish origin, have largely given place to grades of Shorthorn, Hereford, Holstein, Jersey, and other breeds, till there are many times more pure blood Jerseys in this country than there are in the Island of Jersey, and more Shorthorns than there are in Great Britain. The increase of weight of dressed beeves has been very great, there has been a remarkable increase in the percentage of net beef to live weight; average quality has been improved, and the time of growth and fattening has been shortened by more continuous, nutritious, and liberal feeding.

The difference between the unimproved Spanish Longhorn and the improved stock of the central prairies of the West is possibly best shown in the average value of beeves exported. In 1860 there were 3,092 Southern Longhorns shipped to Cuba, valued at $54,382, or $17.59 each, while seven times as many cattle were shipped to Canada from the West, at an average of $39.74. These figures show the difference between the respective value of the two classes of cattle in 1860. None were exported to Europe at that date, but last year there were 318,932 sent to England, bringing $26,469,210, or $82.99 per head. This gives an idea of the great increase in average value of Northern cattle.

If we compare aggregate shipments at the two dates, two very striking points appear—the increase in numbers exported, and the advance in value. In 1860 the numbers were 27,501, valued at $1,052,426, or $38.27 per head; in 1890 there were 394,836 exported, valued at $31,261,131, or $79.17 per head. Thus it would require five Longhorns of 1860 to equal in value one Shorthorn of the present time; and the average value of all animals exported has more than doubled in thirty years, notwithstanding the low prices which caused such depression in 1890.

There were no exports of fresh beef until 1877, when they amounted to 49,210,990 pounds, increasing with some fluctuation, rising above 100,000,000 pounds in 1881, and 1884, and 1885, and again in the past three years, the shipments of the fiscal year, 1891, being 194,045,638 pounds. In addition to exports of fresh beef and beeves, those of canned beef, in 1891, amounted to 109,585,727; cured beef, 90,286,679; other cured, 1,621,833; beef tallow, 111,689,251; of all beef products, 507,229,428 pounds.

The total number of cattle in 1840, according to the sixth census, was 14,971,586. At the close of 1890, according to estimates of the Department of Agriculture, the aggregate was 52,895,239, or 16,019,591 milch cows, and 36,875,648 other cattle. The tenth census made the total number 39,675,533, in 1880; the census figures for 1890 have not yet been completed.

The comparison of numbers of neat cattle, in 1840 and 1890, furnishes no criterion for judging of the beef supply. An animal, yielding six hundred pounds at the age of thirty months, makes just three times as much beef per annum as one that produces three hundred and twenty pounds in four years, and, of course, a million of the former would produce as large a beef supply as three millions of the latter. And this accounts for the mystery of abundance and low prices, while the ratio of numbers of cattle to units of population has been decreased. There are pseudo statisticians who

labored over this problem without solving it or realizing the cause of their failure. The element of time is quite as important in beef-making as is the ultimate weight of carcass, and the speedier result has, so far, improved quality as much as it has increased quantity.

FIG. 4. GANG PLOW, INVENTED 1884.

It is due first to breeding, and next to feeding. Even the Texan has become a modified Shorthorn or Hereford in the Mountain States.

THE MARVELOUS DEVELOPMENT OF SHEEP.

Sheep have shared equally with cattle the improvement of a half century. The ratio of flocks to population has decreased, but the weight of fleece has much more than doubled. The average has progressed from two pounds per fleece—first slowly, and since 1860 more rapidly—to five pounds or more, and the supply of home-grown wool, per unit of population, is more than doubled, while the quality has also been greatly improved. A large element of increased supply, not generally realized, is the great increase of sheep slaughtered for mutton, the butchers' wool or pulled wool additional entirely to the fleece wool sheared in spring and fall. The American Merino has become the bearer of the densest and most serviceable fleece of any branch of the Merino family, and is sought by breeders even in Australia for its popular characteristics.

The wool industry, like the animals it represents, is perhaps more easily stampeded by panics than any other rural enterprise, yet in the long run, if wisely managed, it is as profitable as any. It is at present growing, and, though prices of wool have suffered a period of depression throughout the world, it is less depressed here than in other countries, and is constantly becoming more hopeful and encouraging. The growing importance of the supply of good mutton, and the tendency to higher prices, are elements in the promise of better profits which the future holds out to sheep husbandry.

The numbers of sheep in 1840, by the official enumeration, were

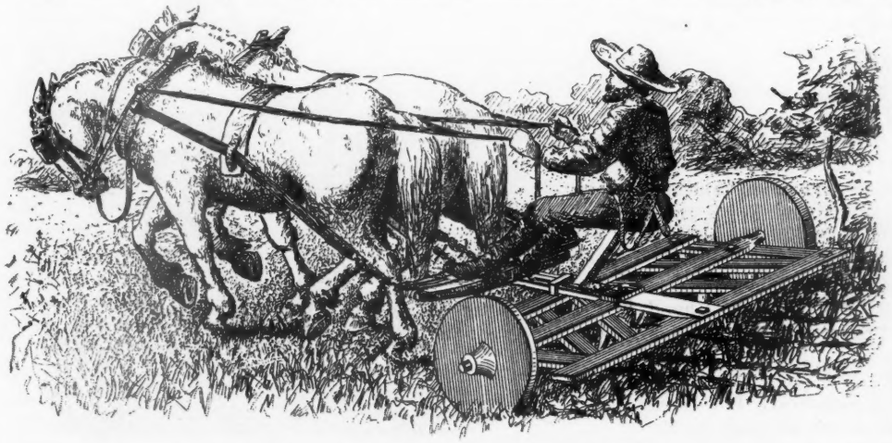


FIG. 5. WHEEL CULTIVATOR, INVENTED 1846.

19,311,374. Two-thirds of all were in the six States—New York, Ohio, Pennsylvania, Connecticut, Virginia, and Kentucky, and more than one-fourth were in New York. Vermont had less than half a million at that time. The increase was small for twenty years, and the advance in weight and quality of fleece was slow until the war period, which greatly stimulated production throughout the world, only to glut the markets in 1867 and 1868, and cause an unprecedented reduction in all countries, from the effects of which the wool-growers of the United States were only partially saved by the operation of the tariff of 1867. It could not prevent some reduction of prices, which relegated to the knife four millions of sheep in two States, Ohio and Michigan. After the effects of this panic disappeared, the industry began a steady progress, the quality and weight of fleece advanced and numbers increased. The census of 1880 made the aggregate 42,192,074, and the Department estimate at the close of 1890 was 43,431,136. Until 1884 numbers increased, when a decline set in, in consequence of discouragement arising from tariff reduction, and the increasing use of imported carpet wools for various other purposes. The exportation of mutton has recently given promise of growth. In 1890 it amounted to 256,711 pounds. It should be greatly enlarged, and, with our favorable conditions for sheep-raising, we should be able to increase this amount to many millions of pounds annually. The use of mutton is rapidly increasing, both at home and abroad, and will have a marked influence on the future of our sheep husbandry.

THE IMPROVEMENT OF AMERICAN SWINE.

The same beneficial influences have molded, from the old breeds of swine of Europe and Asia, types peculiarly suited to the requirements of this country. The Poland-China is a development as distinctively American as our fields of maize. They possess a breadth and fatness equally amazing. The Jersey Red and the Chester White are types possibly better suited to Eastern conditions, yet both these breeds are excellent illustrations of the development of the swine industry of the United States. The average time of growth has been greatly shortened, and the animals are so prolific that it is easy to increase numbers to suit the size of the corn crop. This flexibility in the supply makes it difficult to calculate the results of rapidly occurring changes in production.

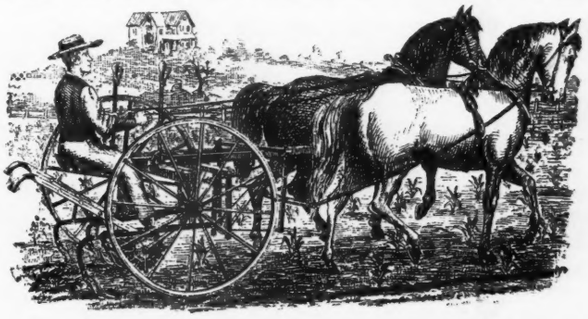


FIG. 6. PARALLEL, RIDING CULTIVATOR, INVENTED 1884.

The reopening of the gates of demand in certain European countries, which have been closed for a decade, doubtless insures larger sales and steadier prices in the future, and a long term of prosperity to this branch of animal industry.

In 1840 the official aggregate of swine was 26,301,293. The estimated number in 1890 was 50,625,106. Improvement in weight and time of maturing has the effect of more than quadrupling the production of pork, instead of merely doubling it. These changes account for the possibility of large consumption and extensive exportation, and for all the profit attainable in this industry. A comparison of the statistics of maize and pork products, in this and other countries, makes conspicuous the relations of the two industries and the enormous proportions of both in our national economy.

There has always been a surplus of pork products. Exportation of bacon and lard antedate the Goverment itself. Between 1850 and 1860 bacon and hams ranged between 5,000 and 46,000 pounds, and averaged 28,000 pounds. A rapid, permanent increase

commenced in 1872, when the exports were 246,208,143 pounds, rising to 759,773,109 pounds in 1880. Then the French, German and other edicts of exclusion reduced the trade about one-half in 1883. In 1890 the figures ran to 608,490,956, and they are nearly as much in 1891. Lard has made a large increase, and the figures for last year, 498,343,926 pounds, were the largest ever made. The salted pork amounted to 81,317,364 in 1891. The prospect is now favorable for a foreign exportation of swine products, exceeding the highest altitude of the trade prior to the European edicts of exclusion.

DAIRYING AND POULTRY.

The dairy interest has also had a similar development. The best blood of Europe, for cheese or butter, has been diffused liberally in dairy sections, and the increase in quantity and quality of milk has been considerable. The introduction of the cheese factory system over thirty years ago, has made a foreign market possible, and more recently the butter factories have given uniformity of product, impossible in farm dairies, and quality superior to the average farm products. The average yield per cow varies from about 475 gallons in the best dairy States to scarcely a third as much in the least progressive of the non-dairying States. The average for the country is probably about 360 gallons. The exports of fifty years, giving aggregates by decades and even millions of pounds, are, butter, 34, 36, 133, 152, 188; cheese, 91, 79, 447, 1000, 1042.

The poultry interest is about half as large as the dairy, and has witnessed an extraordinary development. The best breeds of the world, and new ones of American origin, have enriched greatly the value of the fowls of the barnyard. Since last October the West

FIG. 7. HAND PLANTER, INVENTED 1856.

has been furnishing millions of eggs, formerly obtained from Canada, and our friends across the border have been paying four and three-tenths cents of the five cent duty on the few eggs they have sent us!

THE GRANDEST CROP OF ALL.

While population is less than four times as great as in 1840, the corn crop is five or six times as large. The product was reported at 377,531,875 bushels. Tennessee then stood first in production, followed in order by Kentucky, Virginia, Ohio, Indiana, North Carolina, and Illinois, seven States which produced more than five-sixths of the crop. The center of corn production, then in the South, has been moving northward and westward. The Mississippi river now divides into nearly equal parts the corn product of the United States. The seven States of principal production, from which comes the commercial surplus, are now Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, and Nebraska. In 1890 these States produced, as estimated, 1,413,592,000 bushels of corn, nearly four times as much as the whole country in 1840, and about as much as the entire exportation of corn and corn-meal in fifty years.

In the first twenty years of this period the exportation, in round numbers, amounted to over 133,000,000 bushels, not much more than a third of the product of Iowa, in 1890. In later years the proportion exported is greater, ranging from two to five per cent. of the crop, but not enough to materially affect the price. As it is used abroad for feed for horses and cattle, in competition with other crops, it is only procured when cheap, in one year two million bushels, at highest prices, in another one hundred millions, at the lowest prices. The price of corn in Liverpool is, therefore, made by the supply for home consumption, contrary to the prevailing notion that Liverpool makes all prices.

It is not assumed that the crop and all its products are consumed at home, as the pork products, beef, and butter and cheese, which were shipped to foreign countries, utilize a portion of the crop. This secondary form is a far better shape for our corn exports, as it reduces greatly the expense of transportation. The error of assuming that these exports are mainly corn, however, should be avoided. Grass, fresh or dried, is the main element in

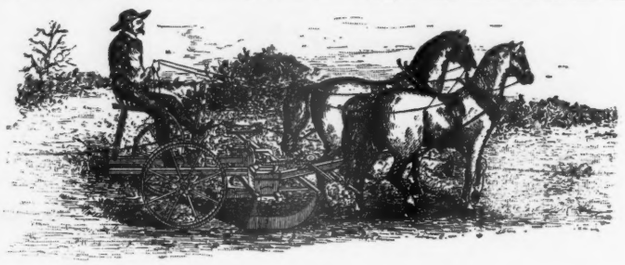


FIG. 8. CHECK ROW PLANTER, INVENTED 1883.

them all. A large portion of our wheat exports, canned and salted beef, especially, are made with little corn, or none at all, and pork products are only partially produced from corn.

The corn crop of the world is larger than that of the wheat, and this country produces fully three-fourths of it. The smallest crops usually yield fifty per cent. more per unit of population than the home-grown supplies of all the cereals of Europe, and the largest about twice as much per head as Europe produces. A small crop assures high prices, but has a paralyzing effect upon these dependent industries. The average price of the entire crop has been as low as twenty-seven cents, and as high as sixty-four, within twenty years, and the average for the period has been not far from forty cents. An average price proves the best, all things considered, for producer and consumer.

THE GREATEST WHEAT COUNTRY OF THE WORLD.

The supply of wheat per unit of population has been almost doubled in a half century. Taking the results of the several census enumerations, that supply was 4.96 in 1839, 4.33 in 1849, 5.50 in 1859, 7.46 in 1869, and 9.16 in 1879. The present crop, of 1891, will be the largest ever grown either in this or in any other country, and the supply per head will not differ very widely from the largest previous records.

The official record of wheat grown in 1839 was 84,823,272 bushels. About five-eighths of it was produced in four States—Ohio Pennsylvania, New York, and Virginia. The progress of

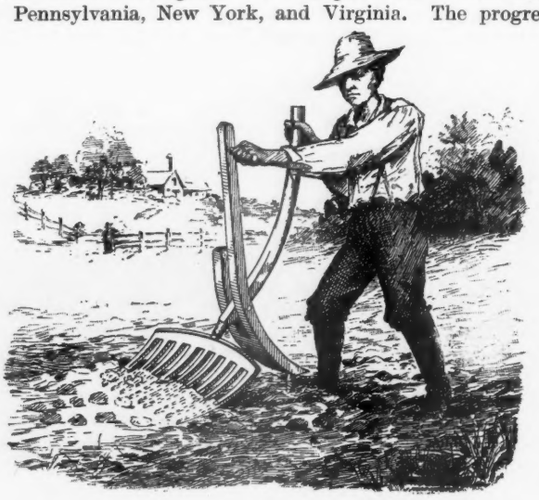


FIG. 9. HAND POTATO DIGGER, INVENTED 1856.

wheat growing westward has been natural, and the logical results of migration and national development. There has been much nonsense perpetrated by superficial writers with regard to it. Western New York, Ohio, Michigan, Illinois, Dakota, and the Pacific coast, have been indicated as landmarks of this progress, and the impression given that in each case cultivation was followed by abandonment, virgin fertility by barrenness, and that the movement

westward was, therefore, compulsory. There is not a word of truth in it. Wheat has, hitherto, been distinctively a pioneer crop, and, as new lands were opened, a bread supply for the settlers became a necessity, yet Western New York produces nearly as much wheat as ever, while varied rural industries of that region have greatly surpassed the values and profits of primitive cropping.

The fiction of exhausted soils is absurd. The change in Wisconsin, and Eastern Iowa and Minnesota, from wheat to milk and meat, was not due to threatened exhaustion of plant food, but to a wise and scientific distribution of rural production. Those soils cannot be exhausted by a few years of superficial scratching, that is misnamed cultivation; they may become so weedy that there is no room for wheat, and the yield may decline.

A change that is taking place in wheat-growing in Iowa, where it was nearly abandoned, illustrates, strikingly, the soil capabilities of that region. Clover is a great fertilizer, and corn a hungry soil depletor; yet an eminent authority informs me, from large experience, that he gets twelve bushels of wheat per acre following clover, and fifteen after a corn crop. Why? Not on account of superior fertility of the cornfield. Simply because cultivation between the corn hills, costing only sixty cents per acre, furnishing a sheltered surface, which prevents winter killing, enables him to grow a crop which he cannot obtain from the smooth surface of the richer clover sod. This device, not born of superior skill in cultivation, but a sort of Yankee trick, to circumvent an adverse phase of Nature, is giving quite an impetus to wheat-growing in Iowa, and adding millions of bushels to the crop.

We have been told by prophets of the good day coming, as a

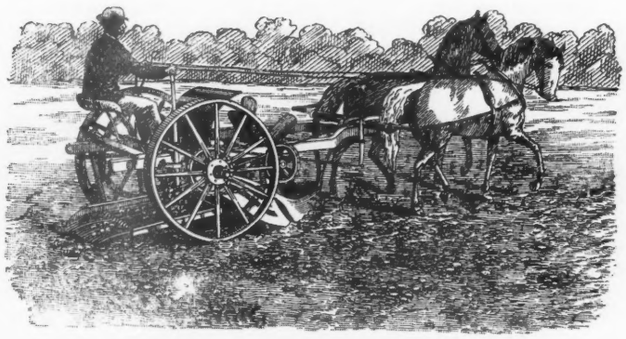


FIG. 10. ROTARY POTATO DIGGER, INVENTED 1882.

solace for past calamities, that wheat-growing is increasing at a much slower rate than population, that the exhaustion of the surplus is inevitable, and that the crisis is at hand, when the ocean freighters shall carry no more bread grain to Europe, and the day of importation from India or South America shall speedily follow, and home prices shall boom, and the hearts of the wheat-growers shall be made glad. This is cheerful, and also highly important, if true. Once we exported 186 million bushels; recently the shipments dropped to less than half that figure. That looked like fulfillment of the prediction; but immediately comes a crop which promises an export little less, if any, than the largest ever made in the dark days of semi-failure of European wheat production.

I have for a long time intimated the probability, even the desirability, of a larger proportion of home consumption, and smaller exports of the raw products of agriculture. My belief is still in this direction, but I cannot refuse to see that fluctuations and change still rule, and nowhere more than in this country. A guarantee of a dollar per bushel on the farm for five years would secure the planting of double the present acreage. I have seen an increase of thirty to forty per cent. in the cotton crop in a single year, and a reduction of one-third in price as a result. I have seen hops selling at five cents per pound, and again at a dollar. Ten per cent. of the flocks of the United States have been destroyed in a single year to make way for a change of rural industry. The movements of agricultural exploitation are not yet fixed like those of the planets; they resemble more the popular idea of the erratic orbits of comets. When two millions of men, taken largely from the fields of agriculture, were sent to the fields of war, the remaining farmers met the demand for consumption and waste, and entered at once upon an era of exportation of meats and breadstuffs that astonished the country and the world. It is quite too early in the history of this nation to limit either the resources of its soil or its labor.

The progress of exportation of wheat has been remarkable in these fifty years, In the first decade it was little more than a

FIG. 11. PRIMITIVE HAY LOADING.

hundred million bushels; in the next about two hundred; in the third it nearly doubled again; in the fourth it exceeded eight hundred millions; and in the fifth it reached nearly twelve hundred million bushels.

KING COTTON.

In the cotton plant, this country has a resource of peculiar agricultural value. It has found here climatic conditions which have made the United States the center of the cotton production of the world. More than half of the cotton of which any definite record can be made is produced here, mostly in nine States, from North Carolina to Texas. A few counties in Florida, and those of the southwestern corner of Virginia also grow it. The invention of the cotton gin, about one hundred years ago, made cotton a

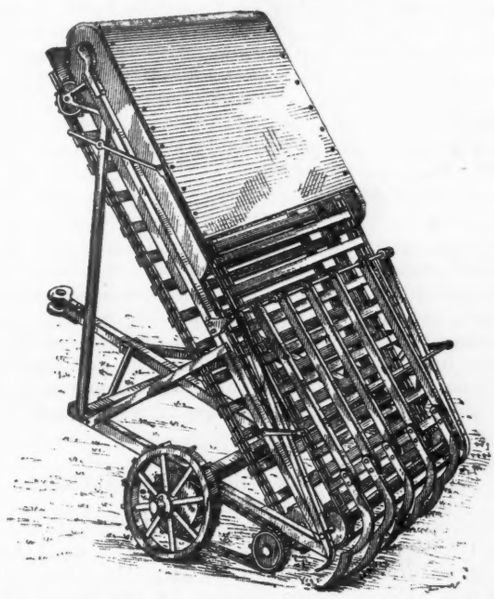


FIG. 12. HAY RAKER AND LOADER COMBINED, INVENTED 1888.

commercial product, increasing in volume rapidly, at first mainly exported to Europe, as is two-thirds of the crop at present.

In 1841-2 the crop movement reckoned 1,688,675 bales, four-fifths of it grown in Mississippi, Georgia, Louisiana, and Alabama, in the order named. During the civil war its cultivation practically

ceased, and after the extinction of slavery the prophecy was frequently made by cotton growers that the volume of 1860 would never again be attained. They made the same mistake as do the pessimists of the present day with regard to wheat and other crops. Last year the crop was almost twice as large as the largest under compulsory labor, and more than five times the size of the crop of 1841, when cotton was assuming princely airs and taking first place in the nation's exports, and dominating international exchanges.

The movement of 1890-91 was 8,652,597 bales of 498.81 gross pounds each. The exports were the largest ever made, aggregating 5,820,779 bales for the fiscal year, against 5,020,913 bales the previous year. This increase of shipments has overstocked foreign markets, and of course reduced the price; another evidence, if any were wanting by any sane man, that producers can easily reduce prices by increasing production. A just balance of values, secured by wise distribution of cropping, is the great safeguard against financial adversity. A diversion to new products that are needed relieves the plethora of production of the common staples and restores the equilibrium of supply and demand. New products are needed in the South, in addition to such auxiliary industries as fruit-growing and market gardening.

OTHER CEREALS.

The crop of oats was considerably larger fifty years ago than that of wheat, aggregating 123,071,341 bushels. It has much more than kept pace with population, reaching a product in 1889 of 751,515,600 bushels, as estimated, grown on 27,462,316 acres. It is a crop, like corn, depending almost entirely on home consumption, mainly as stock feed, but to a limited extent as food for man.

Rye and buckwheat are not extensively grown, and not increasing in proportion to population. The product of rye in 1839 was 18,645,567 bushels; that of buckwheat 7,291,743 bushels. Barley has increased in much larger proportion, as the record was only 4,161,504 bushels, from ten to fifteen fold, and yet not enough to supply the demand, as twice as much has of late been annually imported as was then produced. Yet the production of these three crops constitutes less than three per cent. of the production of cereals.

THE TOBACCO STAPLE.

Tobacco was one of the first crops grown in this country, more than a hundred and fifty years before the national government was organized, and was exported regularly from the first. With it wives were purchased by the early immigrants, and later their daughters were dowered with its proceeds. It is still a great crop of Virginia, as well as of Kentucky, Tennessee, North Carolina and Maryland, for manufacture and export; while the production of cigar leaf is monopolized by the Connecticut Valley, three counties in Pennsylvania, three counties in New York, and a few in Wisconsin and other States. It was a great crop fifty years ago, the official record making the product 219,163,319 pounds, while the export of leaf tobacco in 1840 was 119,484 hogsheads, valued at $9,883,957. The exports of 1890-91 were, leaf tobacco, 236,969,589 pounds, valued at $20,710,911; stems and trimmings, 12,263,016 pounds, valued at $322,848. There were also exports of manufactured tobacco and cigars to the value of $4,186,713. This is a product that cannot increase in the same ratio as population.

Europe produces as much tobacco as America, restricts cultivation, and controls importation, manufacture and sale. Our product gives variety, and is superior in strength and flavor, and is imported by Europe under these limitations, and cannot be had without them. Now we manufacture and consume more than we sell, and this disproportion will increase unless the habit of its use shall greatly decline.

A NEW BIRTH FOR THE SUGAR INDUSTRY.

The product of sugar in 1840 was reported at 155,110,809 pounds, of which 119,947,720 were made in Louisiana. A rapid increase in cane sugar occurred, followed by practical abandonment during the civil war. The Louisiana estimate for 1889-90 was 287,490,271 pounds. For fifteen years there has been progressive experimentation with sorghum and beet sugar. The latter is now entering the factory stage, and its promoters promise rapid and extensive development. The ultimate result will assuredly be the establishment of sugar-making, from cane and beets, and sorghum as one of the great industries of the United States.

OTHER CROPS.

It is not necessary to enumerate all of the products which represent our rural industries. Fruit-growing has made great progress of late, especially in sub-tropical fruits, and raisins, prunes, peaches, apples and other dried fruits, reducing the imports of such goods. The native citrus fruits control our markets and relegate the old foreign sorts to secondary place and price. Flax-growing is just now enjoying great extension, as its growers are just learning that a valuable fiber can be produced in addition to the seed. Other fibers, also, are attracting attention and inducing experiment.

Potatoes, rice, hops, peanuts, and many other products, are dividing the attention of cultivators and giving diversity to production and remuneration to labor. The list should be increased, in every direction possible, for the relief of congested industries and the supply of required consumption.

Next to higher skill and better cultivation, if not of greater importance, seems the establishment of new rural industries. Already some have been initiated. The success of agriculture in the future depends on their development. Adequate remuneration for rural labor is not possible without them. The evolution of labor-ameliorating machines and appliances, the increase of production through intensive practice, demand necessarily an extension of the range of production, and enlargement of the list of products. There is immediate demand for such products, to the extent of $200,000,000, for which agricultural labor is pining, and of which the country is annually drained for the enrichment of foreigners. Among these products are sugar, fibers for textile and cordage uses, fruits, nuts and vegetables in variety.

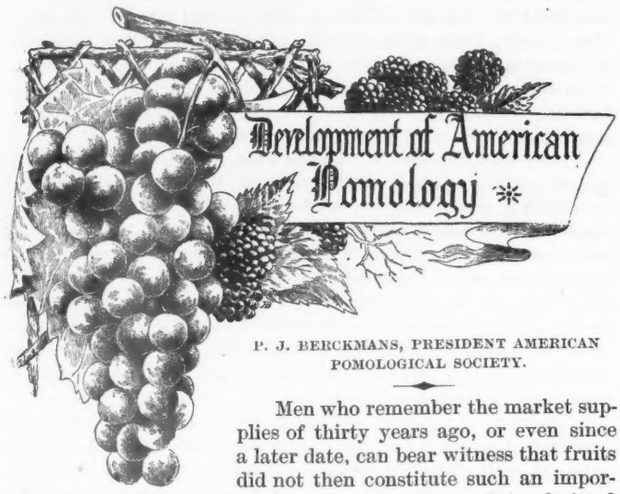
THE OUTLOOK FOR THE FUTURE.

This retrospect of the half century covers a period which represents a very large part of the agricultural achievement of North America since the advent of white men. What will be the record of the next half century? Where is the seer who can accurately forecast it?

There are signs of the times that at least foreshadow probable development. So far, our agriculture has not passed its crude stage. Its mission has been to subdue land, under a practice that has been wasteful. Intensive culture has only occasional examples, too scattering to serve efficiently as object lessons. Our agricultural schools and experiment stations are reaching practical farmers through results of their experiments and their stimulation of popular teaching in farmers' institutes, dairy conferences and grange discussions. The rural classes are enjoying educational influences which cannot fail to render agriculture more productive and remunerative. Superficial culture and low yields should no longer characterize it. We must not forget that with the average yield of England our wheat area is more than ample to produce a thousand million bushels. It is folly for us to rest stolidly with twelve bushels per acre. So with many other crops. A few individuals, intelligent, alert and thorough, are already doubling these old averages. A few may follow their example in a year. In fifty what may we expect?

Progress in these lines, directed by skill and industry, business tact and close economy, will bring to the farmer comfort and competence, which the indolent and improvident can never share. The one will ever be cheerful and thrifty; the other in debt, difficulty and despondency. The one will be indebted to mind and muscle for his fortune; the misfortune of the other will be indebtedness represented by a mortgage.

Intensive Farming. — Year by year we are coming nearer the farming that has long prevailed in Europe. In the Eastern States the aim is to grow a large crop upon a small area, while in the far West the total only is looked at, and acres are completely worthless. But things are changing. Land is going up as the fertility is going down, and soon it will be necessary to base everything upon the market value of a load of dung. There is much comfort in this for the Eastern farmer, who needs to use every scrap of fertilizer he can rake and scrape together. He cannot afford to dissipate the effect of a ton of fertilizer upon a ten-acre field. He feels that he cannot sow it broadcast upon a single acre, but carefully places a handful in each hill of corn or potatoes. Manure is as much a factor in farming as seed, and the load from the barnyard goes ahead of the seed bag from the granary. Till well what is tilled.



P. J. BERCKMANS, PRESIDENT AMERICAN POMOLOGICAL SOCIETY.

Men who remember the market supplies of thirty years ago, or even since a later date, can bear witness that fruits did not then constitute such an important feature in this respect as they do at this time. It is admitted that pomological products have, since the most remote ages, played an important part in the food products, as well as having been the necessary symbolic adjuncts of many historic events. From time immemorial fruits have been recognized as the æsthetical products of the soil, and he who followed their cultivation was, even in the days of Pliny and Columella, admitted to be an agriculturist of high accomplishments.

FRUITS IN ANCIENT AGES.

When the spies were sent out, by the Israelites, to explore the Promised Land and ascertain its fertility, they took to their

MARSHALL P. WILDER, FIRST PRESIDENT AMERICAN POMOLOGICAL SOCIETY.

brethren, as a visible illustration of the richness of the soil and its productions, a single cluster of grapes, which was so large and heavy as to be borne upon a staff by two men. Thus the Grape of Eshcol was considered, by those clear-headed men, as the best evidence that a land that could produce such wonderful fruit would also yield, in abundance, such products as were necessary for the sustenance of their people. How gracefully do the ancient poets allude to the cultivation of fruits as the happiest and most elevating occupation of man. The practical illustrations we find in their songs denote that, even in their days, the science of pomology had been recognized as a potent factor in the world's educational progress. During the Middle Ages, when scientific knowledge was mainly relegated to men belonging to religious orders, we find the most erudite of the early pomological writings to emanate from men, whose life being free from this world's cares, devoted much of their time to the improvement of fruits, and many of our pears, apples, and other fruits, which were cultivated in our forefathers' gardens, owed their origin to the painstaking care of denizens of cloisters, who were skillful fruit growers as well as scholars.

The oldest pear of which there is any record is the Winter *Bon Chretien*. This, according to Monsieur de la Quintinye, director of the fruit and vegetable gardens of Louis XIV., King of France, was known to ancient Rome, and cultivated there, under the name of *Crustumium* and *Volemum*, where this fruit often ornamented the magnificent feasts offered to its triumphant heroes, or to honor the tributary kings who came there to render homage to the masters of the world. Its name is, according to this author, derived from its appearance, which is coeval with the birth of Christianity. But another tradition tells us that when the chaplain of the then King of France, Henry the IV. (whose reign covered the period between 1580 to 1610) presented him with a dish of pears, of unusual attractive appearance and excellent quality, that jovial monarch dubbed it the "Pear of the Good Christian," and for more than two centuries the name of *Bon Chretien* was given to designate a class of pears supposed to possess peculiar characteristics by hereditary transmission, but which, in later years, has become obsolete. The introduction of this old pear, which is still cultivated, to some extent, in France, marked an epoch in the history of early pomology.

DECLINE AND RISE OF FRUIT CULTURE.

For a long period thereafter progress in bringing new products to light was slow. A century later, however, we find among the best varieties of pears, the Orange, the Two-headed Pear, *Martin sec*, etc., and these were then considered as superior to the *Epines*, *Leschasserie*, *Petit-oin*, *Crassanes* etc. In the list of apples, the *Cahilles*, *Reinettes Court pendus*, *Apis*, *Fenouillets*, etc., were already known, as also many varieties of peaches, such as the Early Nutmeg, Yellow Alberge, Madeleine, Mignonne, *Chevreuse*, Admirable, *Pavie de Pompone*, etc. In plums, the St. Catherine, *Mirabelle*, *Perdrigon*, Apricot Plum, were the most esteemed. The cherries were already quite numerous in their varieties. We find the Montmorencies, *Guignes*, *Bigarreaus*. *Griottes*; while among

PROSPER J. BERCKMANS, PRESIDENT AMERICAN POMOLOGICAL SOCIETY, SINCE 1887

the grapes we notice the Corinth, *Chasselas*, *Cioutat*, *Bourdelais*, etc.

To Mr. Jean de la Quintinye is due the first really practical work upon fruit culture, and he gave great impetus to its extension throughout Europe. Many of the fruits of his day are still successfully and extensively cultivated in certain districts of France, and have been the nucleus from which our early pomologists depended for the material for the improvement of the various classes of fruits. It is interesting to note that, even at that early day, different lists of varieties were made for amateurs, who cultivated only for the pleasure derived from a large collection, and for those who were then classed as commercial fruit-growers. For the first class of growers the essential requirements consisted in the value of a fruit, according to their taste, or of those to whom they were intended to be given. The others, or the commercial growers, looked more to the size, appearance, and productiveness than to quality. Our modern fruit-growers, of both classes, as above referred to, do not seem to have changed in the views which prevailed two hundred years ago, as these are rational and will continue to prevail. After this came a period of comparative stagnation in pomological progress, but a new era began when, at the beginning of this century,

men of scientific attainments, as Dr. Van Mons, Messrs. Knight, Thompson, Rogers, Esperen, and others, brought order out of chaos, and, by their practical writings, gave a wonderful impetus to this science.

EARLY RECORDS OF AMERICAN FRUITS.

As to the earliest records of fruit products in America, it is interesting to trace the many sources to which we owe their introduction. In the "History of Georgia," of the erudite, Charles C. Jones, Ph. D., we find many references to the fruits cultivated by the Indian tribe, which De Leon, De Soto, Ribault, and other early discoverers, found in great abundance. In this it is stated that, "The walnut, the hickory, the pecan, and other nut-bearing trees, were watched and nurtured. Their fruit was industriously gathered, cracked, and boiled, and the oil thence obtained 'clear as butter and of good taste,' says the gentleman of Elvas, was preserved in earthen jars." Again, we read that, in May, 1540, De Sota, before reaching the town of Canasagua, in Upper Georgia, "was met by twenty men from the village, each bearing a basket of mulberries. This fruit was here abundant and well flavored. Plum and walnut trees were growing luxuriantly throughout the country, attaining a size and beauty, without planting or pruning, which could not be surpassed in the irrigated and well cultivated gardens of Spain." When Georgia was first settled by Europeans, there were found an abundance of peaches among the Indian tribes, from the borders of Florida to the mountains, and on the latter many varieties of apples, of excellent quality. It is well known that there existed a regular intercourse between the various tribes from the seaboard and those of the interior, and thus is explained the introduction of those fruits, the seeds of which were first obtained from the Florida Indians, who received them from the monks who accompanied the expeditions of Ribault, De Soto, Laudonniere, and others. These early missionaries planted seed of the best fruits of Europe, together with the planting of the Cross of Christ upon this soil, showing that they held the cultivation of fruits second in importance, in civilizing the Red man, to that of teaching him Christianity.

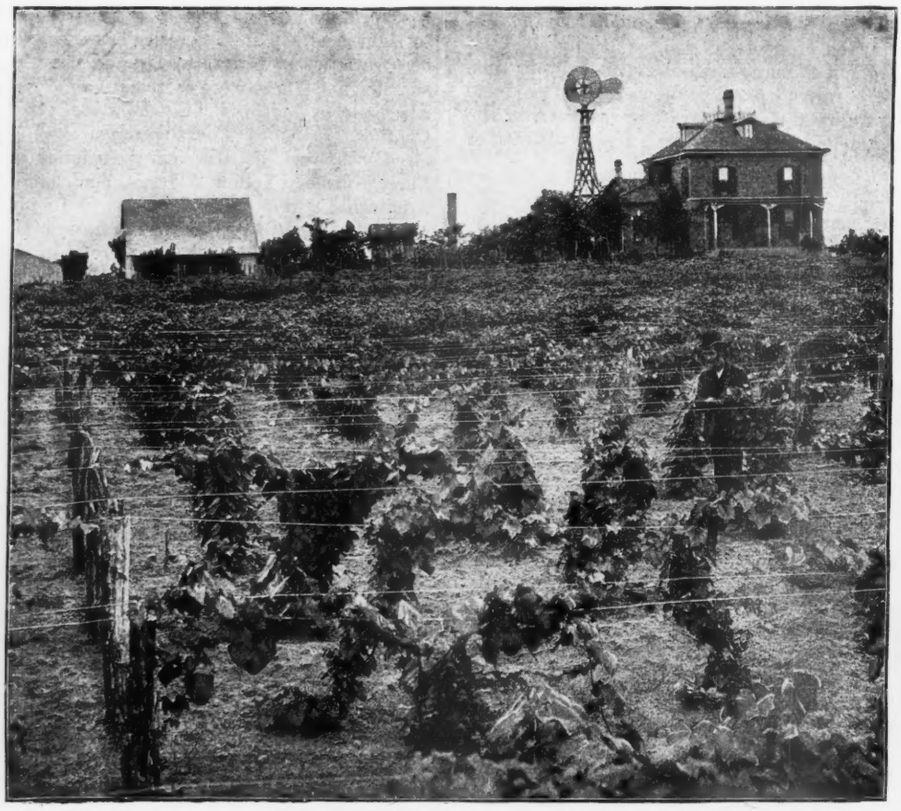


FIG. 1. VINITA VINEYARD ONE YEAR OLD.

PROGRESS AND DEVELOPMENT OF AMERICAN POMOLOGY.

From those early beginnings sprung a class of fruits which, in later days, have proved most valuable to Southern fruit-growers. The type of peaches known as "Indian" throughout the Southern States is really of Spanish introduction, and, if traditions are true, this race was originally introduced into Spain and Italy by the first Crusaders, who brought the seeds from the Holy Land. The Cherokee Indians were noted for the great variety of apples which the early white settlers found in their country, and to-day many old apple trees may be found in the mountains of Georgia and North Carolina, the relics of these early plantings. Methods of propagating other than by seed being ignored by these Indians, accounts for the many well-defined types of apples found in these old orchards. For instance, the Nickayack has doubtless been the progenitor of numberless sub-varieties, or mere forms, which bear the most marked typical characteristics. The Indian peach, first described by Cox as Columbia, who carried pits of this peach to New Jersey, from Columbia Co., Ga., has, by cross fertilization, given numberless varieties, ranging from earliest to latest, and from white freestones to yellow or dark red fleshed clingstones, but all retaining, more or less, the peculiar stripes of the type and the purplish color of the young wood.

The Spanish missions of California bear living witness of the pomological knowledge and zeal of the Spanish monks, who surrounded these religious settlements with the choicest fruits of their native country, and to-day our brethren of the Pacific Coast are reaping golden harvests from products whose beginning dates from the efforts of these soldiers of the Cross. A climate wonderfully adapted to the perfect production of numberless classes of fruits, added to the careful selection of varieties and their improvement by scientific labor, has given to the world such pomological products as are, perhaps, unequaled, as a whole, in any other region of the world.

The territory known as Northwestern owes many of its early varieties of apples to that singular being called "Johnny Appleseed," who carefully saved the seeds of all the best apples which he found among the early settlers and then, in his periodical wanderings through the forests, and in advance of civilization, planted these in some open spot, where, in after years, they proved a source of great enjoyment to the new settlers. French explorers and missionaries left many evidences of their work in still existing relics of fruit trees, of which they planted the seeds around their posts. Thus, the regions originally belonging to France, and extending from the Gulf of Mexico to and including Canada, were early stocked with the best fruits of France. New England and the Dutch colonies received their first fruits from the early emigrants from Holland and England. As new territories became opened to settlers, the various fruits from their former homes were carried with them; thus we can account for the similarity of certain types of fruits found in sections of the Western and Eastern States. Hence, our present pomologists have been greatly aided in their efforts to improve the fruits of their several localities by the early forethought of their predecessors and pioneers in a new country. Early in the present century we find the names of Dearborn, Manning, Prince, Cox, Hancock, as men eminent in the knowledge of fruits. Their writings produced rapid progress in this branch of production, and removed much of the confusion then existing in the nomenclature of fruits, as well as explaining many problems connected with their culture and heretofore but little understood.

AMERICAN POMOLOGICAL SOCIETY.

Soon fruit products became so abundant that a systematic effort was made imperative in bringing this class of products more prominently before the world, and thus foster, by a concert of action of the best fruit-growers, what had already become recognized as a source of wealth production. Massachusetts had already taken the lead in organizing its Horticultural Society; New York followed afterward, but the first move for a congress of fruit-

growers was made by the executive committee of the New York Agricultural Society, to hold such a convention at Buffalo, N. Y., on September 5th, 6th, and 7th, 1848. The name adopted by this body was the "North American Pomological Convention." In October of the same year another convention of pomologists was held, in New York city, under the auspices of the American Institute, adopting the name, "National Congress of Fruit-Growers." During the following year these two organizations consolidated, under the name of "American Pomological Congress," which held its first session at Cincinnati, Ohio, on October 2d, 3d, and 4th, 1850, under the presidency of Dr. W. D. Brincklé. The next meeting was in Philadelphia, Pa., when the name "American Pomological Society" was adopted, and the Hon. Marshall P. Wilder elected president.

The subsequent life of this grand Society has become a part of the history of this nation, and its influence in aiding in the marvelously rapid development of American fruit products, has given to it the lead of kindred associations in this as well as the Old World. For a number of years the sessions of the Society were mainly devoted to discussions upon practical fruit cultural subjects, and the publication of a list of the best fruits, and another of those whose value relegated them for rejection. The most noted American pomologists gave their increasing labors toward the success of this national organization, their names have become household words with all fruit-growers of this and other continents. Wilder, Downing, Hancock, Barry, Thomas, Brincklé, Warder, Manning, Elliott, Prince, Kennicott, Parsons, Field, Strong, Campbell, Bryant, and others, were the pioneer members who composed the illustrious phalanx, which their successors have endeavored to perpetuate, and the work of these men has placed their names upon the roll of honor of our great American citizens. For nearly forty years this Society was presided over by Marshall P. Wilder, whose fame as a pomologist and devoted citizen is known to fruit-growers throughout the world. Under his wise and paternal administration, the Society increased in numeric strength and influence, until to-day it is recognized in the Old World as a safe guide for their own associations to imitate. With the introduction of fruits from Japan, and the rapid development of the orange, and sub-tropical fruit products of California and Florida, the scope of the work of the Society became necessarily enlarged, and, from the modest beginning of its first meeting, it has attained the enormous proportions of its last session. Our most advanced scientists have aided in its labors, and through their discoveries in biology, vegetable pathology, microscopy, and entomology, have given to the fruit-growing public a clearer insight in the causes of diseases and failures of fruit crops, and the means to prevent or counteract the disasters which are so frequent in their pursuit. The work of the Society, while already so preëminent, is yet destined to achieve still greater results in the future. The generous recognition accorded to the Society by the United States Department of Agriculture will, in the future, greatly facilitate its work, and increase its usefulness.

FIG. 2. VINITA VINEYARD TWO YEARS OLD.

AMERICAN GRAPES AND THEIR IMPROVEMENT.

T. V. MUNSON, TEXAS.

In the production of fine raisins, choice grapes for shipping in a fresh state to distant markets, and also for the production of wines, Spain and Italy have, for centuries, been the leading countries. But for the great bulk and best qualities of the wines of the globe, as well as for great quantities of fine table grapes, France stands preëminent. So superior were the varieties for the various purposes in these regions, that, early in the settlement of this country, no notice was given the native American species for vineyard culture. Millions of cuttings and plants from European varieties were introduced into thousands of localities, which invariably, after a fair start, met with final and complete failure.

NATIVE SEEDLINGS.

Disheartened, yet determined not to be deprived of this most wholesome and delicious fruit, a few persons in the Northeastern States, among whom the venerable E. W. Bull stands foremost, began exploring the woods for the best varieties of the wild Fox-Grape, *Vitis Labrusca*, other species in those regions being too small in berry to attract attention, though they were often finer in quality. Seeds of the best specimens were planted by thousands, and numerous varieties, varying in color from greenish white through red to black, were produced. Ives Seedling, Dracut Amber, Perkins, Hartford, Telegraph, Martha, Lady, Woodruff, and a host of others came by that process, but the old Concord still heads the list. This verifies in another way the old saying, that "no stream can rise higher than its source."

ROGERS' HYBRIDS.

Recognizing the above principle, Mr. E. S. Rogers, of Massachusetts, early in the fifties, also hunted for wild Fox Grapes, but with other objects in view than Mr. Bull has had, and his grand list of Labrusca hybrids demonstrated what intelligence could do by intermingling different specific bloods. While on the side of Vinifera, he never succeeded in getting any varieties as high in quality as their source, many of his seedlings were far above Labrusca; but, again, if he never succeeded in raising any in hardiness and resistance to disease to the level of the native, he succeeded in coming far above that of Vinifera. It is, then, to Mr. E. S. Rogers, more than any other person, that the honor of the greatest intelligent pioneer work in ameliorating our wild grapes must be awarded. He has had numerous successors. Some of the most intelligent and successful are J. H. Ricketts, A. J. Caywood, Jacob Moore, S. W. Underhill, and D. S. Marvin of New York; G. W. Campbell, of Ohio; E. Williams, T. B. Miner, and Col. Pierson of New Jersey; Dr. P. Wylie of South Carolina; Mr. White of Massachusetts, and Arnold of Canada.

The preservation of accidental finds, such as the Delaware, the Catawba, and Isabella, though very meritorious, constitutes no part in rational intermixture of different species. As Macaulay has said of the construction of civil history, that it is made up of

the histories of the lives of great men; so the history of the intelligent development of our native grapes is made up of the history of the experiments of intelligent viticulturists.

PURELY NATIVE HYBRIDS.

The fact that no hybrids imbued with the tender, nonresistant Vinifera blood to any great extent, are hardy and certain enough

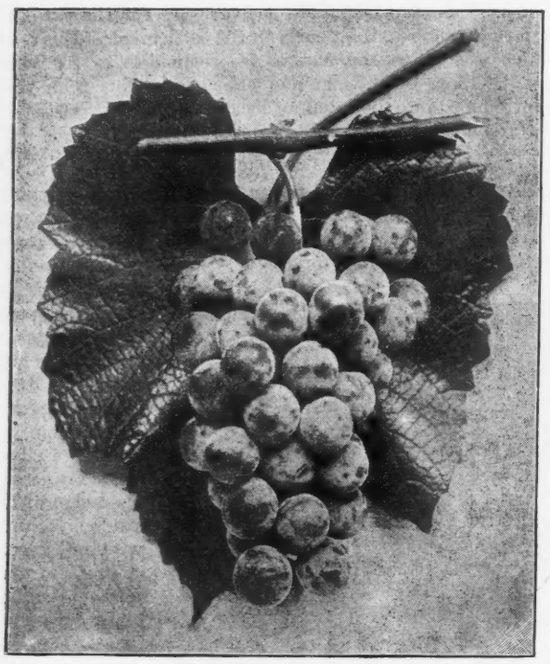


FIG. 3. HYBRID GRAPE, AMERICA.

to be relied upon for extensive vineyard culture, led to a still newer epoch in our viticultural development. The course of this new departure was undoubtedly suggested by accidental hybrids between purely native species, such as Clinton and Taylor, (*V. Labrusca*, *V. vulpina*). These combinations, especially in Taylor, gave a far finer quality and more delicate color and texture than is known in any pure varieties of either of these species. This apparently contradicts the law of not rising above the source, yet, had the constituents of the two parents and their bearing on each other been known, I am pretty sure that no violation would suggest itself. It is, nevertheless, a fact that often combinations of distinct species produce, at least in appearance and flavor, more agreeable products than are found in their constituent parts separately.

Here was health and adaptability fully maintained, and quality greatly enhanced, and their quality was sustained in the seedling progeny of the hybrids, as Jacob Rommel's family of Taylor Seedlings demonstrate, in Elvira, Etta, "Twenty-fifth of July" and others, in N. Grein's Missouri Riesling, in H. Jaeger's No. 100, Elvira seedling, and in many seedlings of Elvira produced by the writer. Another aid in the work of improving American grapes, was the publication, by Bush & Son & Meissúer, in 1883, of Dr. Geo. Engelmann's new analysis and classification of all our then known native species, the best classification, by far that had been given up to that time.

But the inauguration of the new epoch, that discards all foreign blood, except for the South, the so-called "Southern Æstivalis Group," that I have designated as *V. Bourguiniana*, and traced its origin to Southern Europe, was the work of that keen observer, patient student and careful hybridizer, Hermann Jaeger, of Neosho, Mo. He has produced hybrids between a number of native species well worthy of cultivation, especially for wine making; and some of his varieties of purely native hybridity, are excellent for the table.

Following largely in this same line of thought in experimentation, the writer has, for sixteen years, made astonishing progress. He has, however, not entirely ignored the Vinifera blood as found in a few of the most successful hybrids with Labrusca, such as Campbell's Triumph, Rickett's Jefferson, Excelsior, and Lady Washington. In one group these varieties have become so blended with very vigorous and resistant species, as to maintain great vigor, and secure size of berry and cluster, combined with remarkably fine quality. In others he has relied entirely on the efficiency of combinations of native blood.

THE WORK ON HAND.

Under the eminent lights of Engelmann, Planchon, Millardet, and Viala, with whom he has been intimately associated in this work, the writer has gone more extensively than others have done into original investigation of the whole field. In his travels, in collections, and in herbarium specimens, he has examined, botanically, and culturally, and tested nearly every promising variety from every source, as well as producing many thousands of good seedlings and hybrids. These were the best selections from among over forty thousand grown from seed carefully hybridized, or selected from best varieties. From among this host of varieties fruited, a few hundred have been propagated and planted for further trial. Out of all, it is thought not more than two or three dozen are worthy of preservation, and only a small number of these is likely to be introduced. However small the number of varieties may be, the nucleuses of several distinct families of varieties, adapted to as many different sections of the country, have been secured, and these are now to be developed. This development was begun the past summer by cross hybridizing. The seeds thus secured are being placed partly in younger hands, well prepared to carry forward the work, the remainder being retained for development by the writer.

BRIGHT PROSPECTS.

Can we expect to produce from purely native species grapes of as fine quality, and large in berry and cluster as are the finer Vinifera varieties, and yet as vigorous and free from disease as the best wild grapes? This I am confident will be in time fully answered in the affirmative, judging the progress of the future by what has already been accomplished.

If we want size of berry and rich fruitiness of flavor, we have it in *V. Labrusca*, *V. Lincecumii*, *V. Champini*, *V. Doaniana*, and *V. rotundifolia*, each having a distinct character and flavor of its own, to suit every taste, and some, very pure, sprightly and free from musky flavor. This is especially true of *V. Lincecumii*, *V. Champini*, and *V. Doaniana*. If we want purity, earliness, and

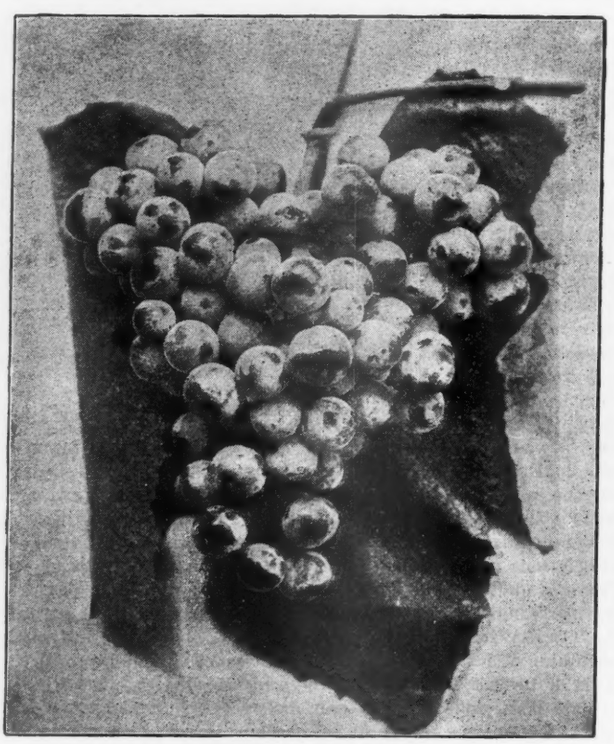


FIG. 4. HYBRID GRAPE, MAMMOTH CLUSTER.

extreme hardiness, we have it in *V. vulpina*, (*V. riparia*,) *V. Solonis*, *V. rupestris*, all of which and their hybrids, with the hard-wood species, grow easily from cuttings, and make fine graft stocks as well as fine table and wine grapes. If we want large clusters, finest vinous quality, excelling even the Vinifera varieties, in these particulars, we have them in *V. cinera*, *V. Berlandieri*, and

to a less extent in *V. æstivalis* and *V. bicolor*, the two last named being larger in berry, and hardier farther north. The infinite combinations of all these are capable of giving almost any imaginable product. Added to all these, but especially suited to the Southern

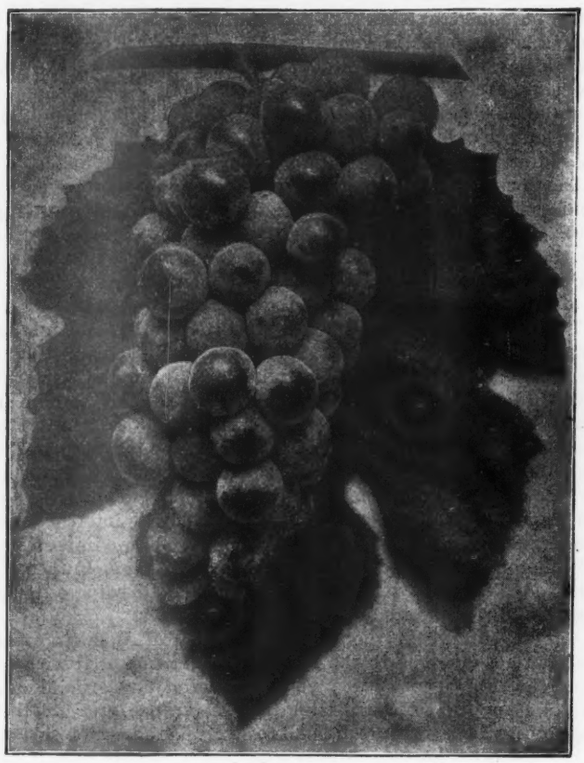


FIG. 5. HYBRID GRAPE, DR. HEXAMER.

States, and as well adapted to the climate and soil as any of the natives, is *V. Bourguiniana*, represented in Herbemont, and others, in the South. Being adapted also to Delaware and the North, what need have we of more or better material?

NATIVE GRAPES FOR CALIFORNIA.

The development of varieties adapted to the conditions of the Mississippi Valley and the Atlantic States would seem, at first sight, to have little influence upon grape culture in California, for there the Vinifera varieties are grown almost exclusively, and to great perfection. The Pacific slope has even a more favorable climate for that species than that of Southwestern Europe. But the insidious Phylloxera has invaded parts of California, and, as in Europe, is forcing the Vinifera varieties on the roots of species found in the Mississippi Valley and the Atlantic States, or exterminating them wherever grown on their own roots. Not only that, but in France some of our purely American varieties and hybrids are being planted extensively for wine, and there are a number of experimenters busy raising American hybrids,, notably so Prof. A. Millardet, of the Faculty of Sciences of Bordeaux. At last, it is probable that the American species will largely supply the world with best vineyard varieties, as grafting vineyards is a tedious and expensive process, and vines do better on their own roots than when grafted, and as do the Vinifera, when not affected by Phylloxera. The fallaciousness of the so called "whole root graft" appears here as elsewhere. The whole root stock is best only when the roots of the variety grafted are attacked by some enemy in the soil, which is resisted by the roots of the stock, as illustrated in American and Vinifera grapes.

PRUNING AND TRAINING.

Nearly all American species of grapes require long pruning and training, in comparison with the Vinifera varieties. Therefore, systems must vary to obtain best results. The writer, after trying nearly every method in use, has adopted, as far more simple, economical, and satisfactory than the others, a system he originated, and which was described in a former number the AMERICAN AGRICULTURIST nearly two years ago. Since then others have adopted it with, so far, the most gratifying results.

[In the accompanying illustrations on the preceding pages Fig. 1 shows Prof. Munson's "Vinita Home" vineyard the first year, and Fig. 2 shows his South vineyard (No. 5) in the second year, under his system of training. Figure 3 represents AMERICA, a hybrid of the best *V. rupestris* with the best *V. Lincecumii*. It is of fine quality and thus far free from disease. Figure 4, the MAMMOTH CLUSTER, is a hybrid between the Wild Post-Oak Grape (*V. Lincecumii*) and CYNTHIANA (*V. æstivalis*). Figure 5 illustrates the DR. HEXAMER variety, produced by hybridizing, *V. Lincecumii* with CONCORD (*V. Labrusca*). Figure 6 shows VINITA, a hybrid of *V. Lincecumii* with HERBEMONT (*V. Bourguiniana*). Like the others this is of fine quality. These four illustrations of grape clusters, taken directly from photographs, represent the foundation types of the strongest and best groups of grape varieties, both of the present day and for the future.]

THE USE OF FERTILIZERS THEN AND NOW.

E. H. JENKINS, PH. D., CONNECTICUT EXPERIMENT STATION.

Samuel Hartlib, writing in 1655, cites, as a main deficiency of the agriculture of his time, that, "We are very ignorant of the true causes of fertility, and do not know what chalk, ashes, dung, marle, water, air, earth, sun, etc., do contribute. Whether something essential or accidental; material or immaterial; visible or invisible; whether saline, sulphureous, or mercurial;" etc., and, in closing, he says, "I, for my part, dare not venture on this vast ocean with my small bark, lest I be swallowed up." Light had, to be sure, begun to break on the subject of plant nutrition fifty years ago, yet the actual state of our knowledge when the AMERICAN AGRICULTURIST was founded, in 1842, was more nearly like that which Hartlib described, two centuries before, than like that which is now the common property of all intelligent farmers.

Liebig's treatise on the "Relations of Chemistry to Agriculture" (1840) introduced the era of careful scientific experiment in the service of agriculture, and the intelligent manufacture and use of commercial fertilizers followed close after. Liebig was the Columbus of scientific farming, who, unlike the cautious Hartlib, "dared to venture on this vast ocean with his small bark," and so opened a new world. The first scientific inquiry and experiment was regarding the feeding of crops and the introduction of commercial fertil-

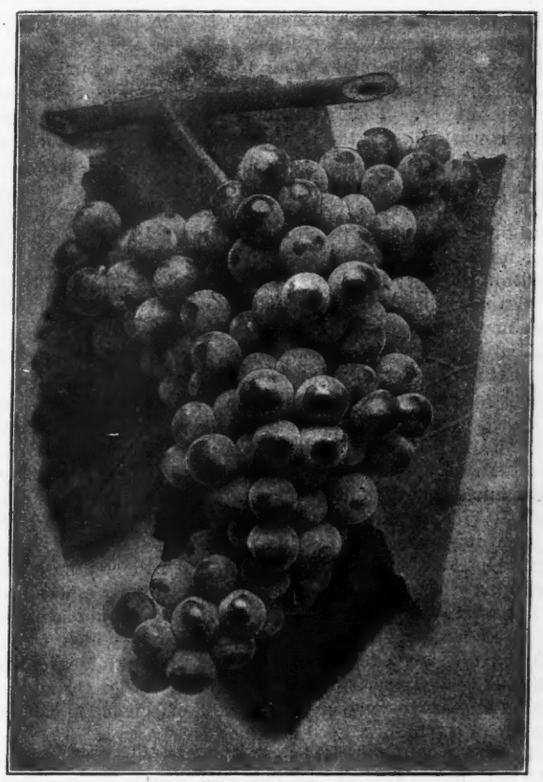


FIG. 6. HYBRID GRAPE, VINITA.

izers, and a more rational plan of manuring was the first-fruits of this inquiry. In these last fifty years we have learned much to guide us in the use of manures. We know what elements are absolutely essential to our crops, and what are unessential. We know which of these elements are most likely to be relatively deficient in

our soils. We know what elements are removed from our soils by different crops, and to what extent approximately. We know about how much plant food is brought down to the soil by the rain each year. We know which ingredients of our fertilizers will be held by the soil, and which are likely to leach out, or to be decomposed. We know the approximate composition of our farm manures, what wastes they are liable to in the yard, from leaching and from fermentation. These must serve—only as examples—of things which are now common property, but which, fifty years ago, were not yet revealed, even to the "wise and prudent."

To-day the wise farmer, in those sections where commercial fertilizers are necessary or profitable to use, bases his calculations, in buying, on the special requirements of the crop to be raised, the previous exhaustion of the soil by cropping, and the special needs of his own soil, as shown by careful observation or field experiment, and he figures not wholly on cords or tons of "manure," but on pounds of nitrogen, of potash, of lime, etc., for these things have come to be farm tools to him, and not mere book-farmers' words. From reputable dealers he can get materials containing those elements of plant food which he desires in specified amount, and in most States he can have these amounts verified by an appeal to an experiment station. Fifty years ago there was absolutely nothing known of all this. The impression was much more prevalent then than now that the worse a thing smelled the better it was as a manure.

Just about fifty years ago a ship brought into Liverpool harbor a small cargo of Peruvian guano. The owner, after vainly searching for a market, was obliged to dump it into the sea to get rid of it. No one wanted it. In New York, to-day, he could readily sell it for little less per ton than good wheat flour brings. In 1842 there was a small market for it in England, and one hundred and eighty-two tons were imported. In the thirty years following, seven millions of tons were sent from the Chincha Islands alone, which nearly exhausted the supply.

A fertilizer factory was not heard of in this country forty-five years ago. To-day there are over four hundred fertilizer factories in the United States, turning out, annually, more than twenty million dollars' worth of goods. It is only within twenty-three years that the immense deposits of phosphate rock have been worked in South Carolina, from which in some years over 250,000 tons of rock have been taken, for use as fertilizers.

Fifty years ago the offal of slaughter-houses was buried, or run into the sea, or allowed to become a terrible nuisance to the neighboring community. To-day scarcely a pound of refuse from slaughter is wasted. All the offal which cannot be otherwise used in the arts is made into a fine, dry, innocuous fertilizer, which is eagerly sought in the markets. In the last century a lighthouse was built in the midst of a wide, sterile moor, in Lincolnshire, England, to guide travelers by night over this pathless desert, where nothing useful could grow. Commercial fertilizers, and sheep have, within the last fifty years, made this desert a fertile plain, one of the most fertile in England, and from the lighthouse no land can now be seen which is not in high cultivation.

But what of the next fifty years? There is every reason to believe that the advance in sound learning and sound practice will go on even more rapidly than before in this matter of the paying use of fertilizers. They will become more and more necessary to successful farming, and will have to be used with greater discrimination. We have a vast deal to learn of the effects of fertilizers on the mechanical condition of the soil, and also on the bacterial life within it. We are only just beginning to learn something of the tremendous importance of this microscopic life in the soil, which is truly the Alpha and Omega, the beginning and the ending of all the higher forms of vegetable life, without whose kindly offices—which come not with observation—sterility and death would soon ensue. There is a vast deal besides for us to learn which is as yet undreamed of. Deep research alone can give us a clearer insight into the subject. Experiments must be made both in the laboratory and field for years to come ere this branch of science can be made productive of the highest good of which it is capable.

What the past fifty years has yielded to scientific study has "paid," even in the eyes of the one who measures everything in dollars and cents. We ought, then, to be willing—or, rather, to insist—that a fair part of the time and energy of the staff of our experiment stations should be spent in the study of those abstract problems which may not yield immediate "practical" results, but promise, rather, to help break the path for a future advance in the science of agriculture, and, in view of this promise, are really the most truly practical. Freely we have received, freely let us give.

AMERICAN DRAFT HORSES.

GEORGE A. MARTIN.

It is only within the last few years that the United States has had any pure-bred draft horses. A class of heavy horses was bred in Vermont, and another in Pennsylvania, but both were mongrels of no particular breed. The Vermont draft horses never made a very large figure except in the pages of books about the horse, nor do the authorities agree in theories as to their origin, though the preponderance of opinion is that they descended from French draft horses brought into the adjoining province of Eastern Canada.

The Conestoga horse of Pennsylvania was an important part of the horse stock of the country before the general extension of railroads. It was a massive and stately animal, of undoubted descent from the heavy German or Flemish draft horses brought over by the German immigrants who settled in Eastern Pennsylvania. A few of them may still be found in that section of the State.

The first pure-bred draft horses imported were Clydesdale and French. One of the latter, a Percheron stallion named Louis Napoleon, was imported to Ohio in 1851 by Fullington & Martin, and in 1856, he was sold and taken to Illinois, where he remained in various hands until his death, in 1871. He left his impress upon the horse stock of a wide region, more than four hundred of his get having been successful stallions. The remarkable success of this stallion, and others which were imported soon after, had a decided influence toward awakening an interest among farmers and breeders in heavy French horses. Large importations of Percheron and other draft horses were made from France, and now some of the most extensive importing and breeding establishments in the country are devoted to French horses.

For several years there was a conflict of opinion among American horsemen as to the proper classification of these heavy French horses. The line between Percheron and several other races of heavy horses was a trifle hazy in France, and it is little wonder if it was sometimes difficult to determine on which side of it to place imported horses in this country. But, largely through the efforts of American importers, "La Société Hippique Percheronne" was organized in France, and a stud book established there. A kindred society, the American Percheron Horse Breeders' Association, was organized, and a corresponding stud book established, in the United States. The "Stud Book Percheron de France" and the "Percheron Stud Book of America" contain the pedigrees of pure-bred Percheron horses, and the respective societies by which the books are issued, work jointly and severally in preserving the purity and promoting the interests of this useful and valuable breed. The French "Société des Agriculteurs," besides its other useful work in the promotion of agriculture, issues the "Stud Book des Chevaux de Trait Français," in which are registered the pedigrees of the draft horses of Northern France. The National French Draft Horse Association, which was incorporated in 1884, publishes the "National Register of French Draft Horses," and in other ways advances the interests of the importers and breeders of French draft horses in the United States.

The first Clydesdales brought to this country came across the border from Canada. But for several recent years large importations have been made directly from Scotland, and no better Clydesdale horses can be found upon their native heath than in many American stables. The interests of this breed are guarded and advanced in its native country by the Clydesdale Horse Society of Great Britain and Ireland, with headquarters at Glasgow, Scotland; and in the United States by the American Clydesdale Association, the secretary's office of which is at Springfield, Ill. The British and the American Clydesdale stud books, maintained respectively by the foregoing associations, are kept with vigilant care, and any attempt to foist a fraudulent pedigree upon either society is reasonably certain to meet with detection and exposure. In the earlier days of Clydesdale breeding it was not an unusual practice to cross the Scottish stallions upon heavy English cart mares, and some of the most notable animals in the Clydesdale foundation stock were the more or less remote progeny of such cross-breeding. But ever since the society was organized, and its stud book established, all such crosses have been regarded with disfavor, and no animal, with a known recent cross of Southern blood, is admitted to registry in either the British or American Clydesdale stud book. There is, however, a limited number of breeders, both in Scotland and in the United States, who approve of this cross, and have organized a society on that basis. The Select Clydesdale Horse Society of Scotland and the kindred American society admit to

registry in their respective stud books approved stallions and mares of the Clydesdale type, even if they are known to be the direct progeny of a cross with English Shires. It is scarcely needful to add that these "select" breeding animals are looked upon by the magnates of the other societies very much as a strictly orthodox churchman regards an open heretic. The Shire horses fill about the same place in the horse world of England that is held by the Clydesdales north of the Tweed. Like their Scottish congeners, they are ideals of massive strength, combined with great docility; neck proudly crested and set on sloping shoulders, deep chest, short back, powerful loins, massive quarters, flat bone, legs "feathered" with long, shaggy hair from the pasterns nearly to the knee and hock. These are points common to the heavy draft horses of both North and South Britain. It is only within the last ten years that Shire horses have been largely imported to and bred in the United States. But the breed has now become firmly established here. The Shire horse breeders, like those of the breeds already mentioned, have a society in England and a corresponding one in the United States. The Shire Horse Society in England and the American Shire Horse Breeders' Association each maintains a stud book, and in many other ways strives to promote the success of the breed. Both the Clydesdale and Shire breeds have contributed to furnish an important element in the horse stock of the United States. For slow, heavy draft purposes, they are unsurpassed.

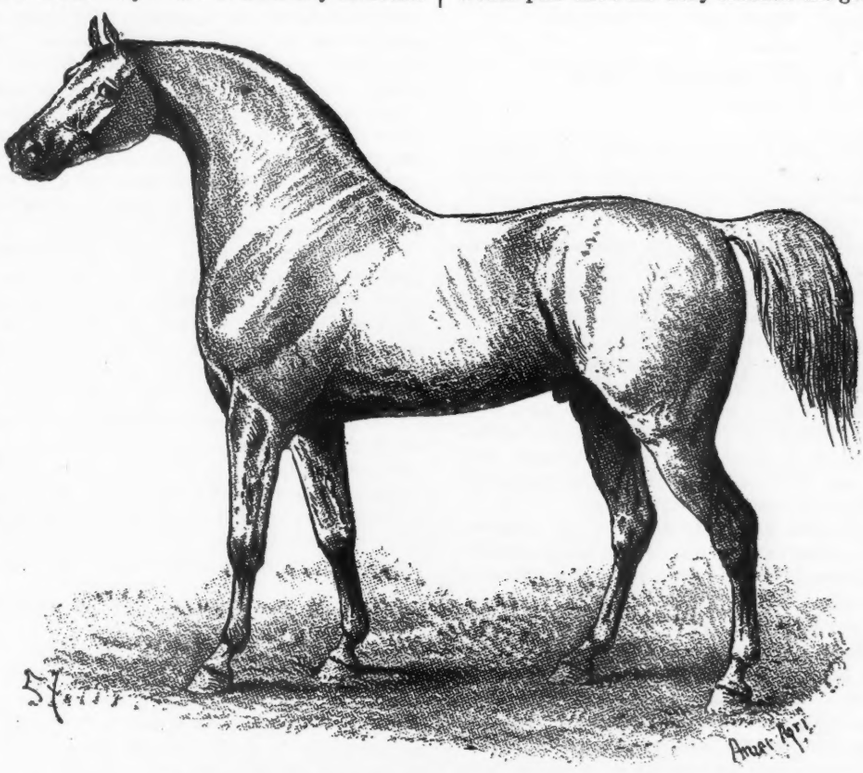


FIG. 1. THE FAMOUS TROTTING STALLION, MAMBRINO.

The Suffolk Punch is the latest acquisition of British horses to this country. It has been bred for ages in England where it is used largely for agricultural purposes. The characteristics of the breed are a good head and neck, heavy and powerful body set upon short, strong legs, free from redundant hair. The Suffolks are invariably chestnut or sorrel in color. They are very docile and kindly in disposition and willing workers. Indeed, it used to be said in England that a Suffolk horse hitched to an immovable dead weight would pull until his belly touched the ground. Though it is only within the last five years that they have been imported to any extent to this country, they have already acquired a deserved popularity in the Western States, despite an unreasonable prejudice against their color. The American looks to the American interests of the breed, while the Suffolk Stud Book Association does the same for it in England. Stud books of the breed are established in this country and in England. Within the present decade, Belgian draft horses have been imported to this country in considerable numbers, and the breed has acquired a recognized place among American heavy draft horses. They are the direct and legitimate descendants of the ancient Flemish horses which contributed largely to the foundation stock of nearly all the draft horse breeds of Western Europe. Belgium, though a little less in area than the State of Maryland, has two societies to maintain the integrity of this breed. One of them, the "Société des Eleveurs Belges" is located at Liége, while the "Société National des Eleveurs Belges" has its headquarters at Brussels. Each society maintains a carefully-edited stud book.

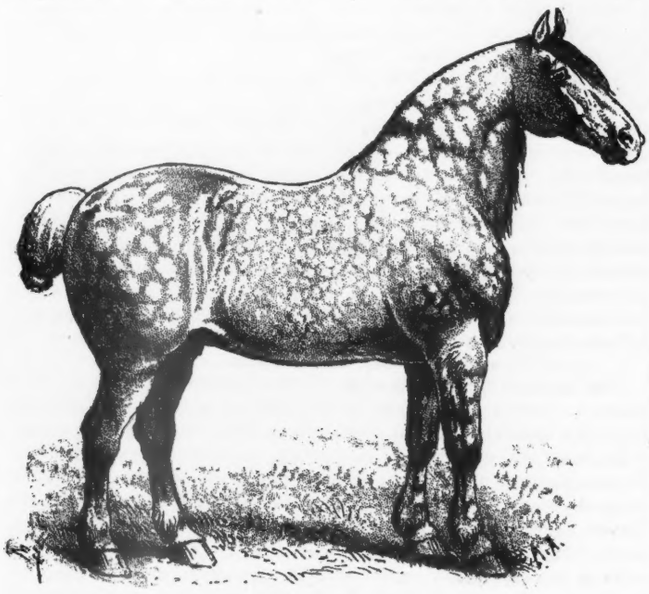


FIG. 2. HIGH-BRED PERCHERON.

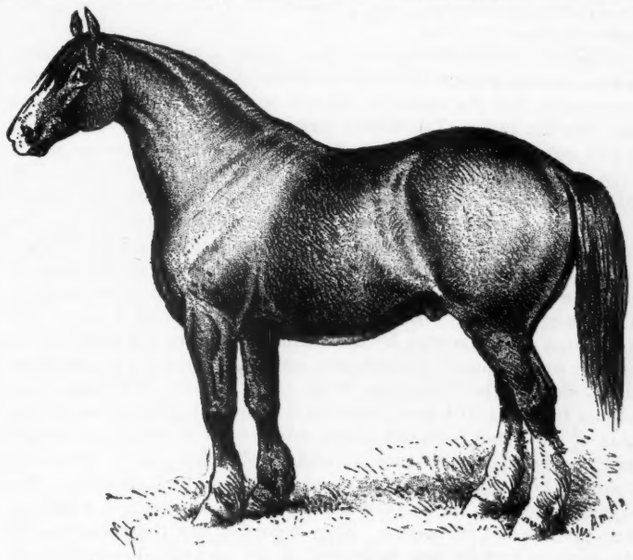


FIG. 3. HIGH-BRED CLYDESDALE.

The "American Association of Importers and Breeders of Belgian Draft Horses" recognizes both the Belgian societies with impartial cordiality and admits to registration in its stud book all animals registered in either of their stud books and their descendants.

The great work of building up and establishing in this country the various pure breeds of heavy draft horses has enlisted the energies and capital of many far-seeing and enterprising importers and breeders. The work has already advanced with great strides,

and enormous value has been added to this description of the country's wealth. Much yet remains to do, and it is not unlikely that within the coming half century the United States will not only raise draft horses for its own needs, but also for heavy export trade.

[A high type Percheron horse is portrayed in our engraving, Fig. 2, on the preceding page. Fig. 3, that of a Clydesdale.]

DEVELOPMENT OF THE AMERICAN HORSE.

A. B. ALLEN.

Owing to such a variety, and from so many different countries as the originals came from, in making up the horses of the present day in America, it has been impossible to create a single homogeneous breed, that could, with any propriety, be called American. We must, therefore, take them as they are known under their present names, and improve each class by itself in the best manner to adapt them to the purpose for which they may be required. This can be done, first, by the use of judicious selections from those now in America; and, second, by taking crosses from foreign horses which are superior in some points to our own, which we wish to improve. By these methods we should, in process of time, come to as near perfection as is attainable, and in a cheap and rapid way. Such a course would be attended with a general increased advantage to the public, and add much to the beauty of the animals, and, when offered for sale, an increased price for them would be easily obtainable without an increased cost of rearing.

The Spaniards were the first to introduce horses into America, which was done in their earliest settlements. These were undoubtedly descendants of the Barbs, brought over to Spain from Morocco by the Moors, when making their conquests in that kingdom. They were cognates of the Arabians, and quite like them in all respects, except being slightly larger in size and stouter in build. They multiplied rapidly here in this genial climate, and on the abundant nutritious grasses. Soon exceeding the requirements of the settlers, the surplus animals were turned out to breed wild on the vast plains, extending in great length on each side of the Andes Mountains. Here they became so numerous as to be of no value beyond their hides, and were then killed by the thousands for these, to be shipped off and sent abroad to be converted into leather, and for other purposes. This stock is now well spread over South and Central America, into Mexico and Texas, with a scattering along the Northwestern Coast up to and beyond California. There, horses vary in size, from thirteen-hand ponies, up to fifteen hands or more, of a servicable sort for all kinds of work, and especially for that under the saddle. They show a free, easy action, sufficiently fast for all ordinary purposes, and possessed of good constitution, hardy and enduring.

The next horses introduced into America were by the French, in the commencement of their settlement of Canada. These also were much like the Spanish, though somewhat stronger and of a little heavier build. The winter climate there is too cold for horses to run out wild to breed as in South America, they consequently have increased but little beyond the wants of the settlers. The stock descended from them have proved extra hardy and sound; many excel as trotters, and are consequently good roadsters. The use of them is increasing for light work, heretofore given to larger horses. It is found now that such work can be more cheaply done by ponies, and they cost less, as they can be reared on short pastures where larger horses would starve. But the latter of a good class were bred to advantage by the farmers, and are yet used for the heavier work. Small, promiscuous importations of horses occasionally followed the foregoing, while the farmers continued their annual breeding at home, but this was too generally done at haphazard, and often from old mares worn out with work, and totally unfit to breed and mature vigorous colts, but they ignorantly thought the contrary, and have so continued in their error. The main thing which has governed them in the selection of a stallion, was the amount of his fee. They regarded not the pedigree, nor the superior powers and make-up. If he was only tolerably good-looking, and very cheap, that was sufficiently satisfactory. What result could one expect from such a course? Why, nothing but horses too often not worth the cost of their rearing. But there were many exceptions, and the general farming stock reared in America has been fairly good.

The most valuable horses used in America for the improvement of the coach and trotting stock, were Messenger and Mambrino, imported from England. (A portrait of the latter, who was the handsomer of the two, is presented in Fig. 1, on the preceding page.) Within the past fifty years the form and style, as well as the pace of the trotting horse, has been greatly improved. These early breeders cared less for looks than for pace, and the main question with them was: How fast can he go? Now, a fine form must be coupled with a fast pace. The latter, as a general thing, has marvelously increased from a mile in three minutes to two minutes and eight and one-fourth seconds, and many are sanguine that a few years hence the mile will be done in two minutes. The general public will never care to ride so fast a pace, and the chief object in breeding a horse up to it, is to render him more certain, when crossed on common mares, to increase the pace of his offspring, it being desirable to obtain a natural easy gait from them of eight to ten miles within the hour, and, if obliged at any time to be pushed, this may be increased to twelve or thirteen miles for a short time without distress to the horse.

For twenty years, or more, past, the larger European breeds have come into unexpected favor in America, for they are now much more than ever before wanted for heavy farm work, city truckage, mining, quarrying, and lumbering. Considerable numbers have been imported, and, aside from being used for this heavy work, they are carefully bred together here male, and female, each in its own distinct class. The stallions are also numerously bred to our largest native mares, and their progeny are turning out well, for the heaviest kind of work carried on in the country. They can be advantageously put to this a year younger than common stock, owing to their greater strength. This is a considerable extra advantage in rearing them, and often pays the cost up to three years old, when they can be sold at a high price, or turned out to heavy work, without danger of over-straining.

WANTED, BETTER PLOWMEN.

It is hardly too much to say that good plowing is the foundation of good farming. In the good old times, when the AMERICAN AGRICULTURIST was younger, and State and county fairs were novelties, plowing matches were frequent and popular. We had poorer plows, perhaps, but in many sections, at least, we certainly had better plowmen. Farmers' sons competed at the plowing matches, and Scotch and English plowmen astonished us by the skillful manner in which they turned straight and regular lap-furrows. "But," we asked, "what is the good?" In our climate, and with modern harrows, pulverizers, and grain drills, such furrows are seldom of any special benefit, while freqently a flat, wide furrow will better withstand drought. We wanted to plow faster, and get in the crops. He was the best plowman who could turn over two or three acres a day. Perhaps we plow too wide a furrow, but there is not much probability of our plowing narrower unless we use plows that will turn two or three furrows at once.

But we need better plowing. Look at many of our fields of oats and barley any year. It is not too much to say that a really clean field is an exception, while patches of thistle are the rule. They are a growing evil. Notwithstanding the fact that we have better implements for pulverizing land and preparing it for the seed, and better cultivators for working among the crops, and really do work our land better than formerly, yet Canada thistles are on the increase; and the reason is largely poor plowing. Without desiring to go into details, we would like to ask every farmer to look carefully to his plow points. The plow goes in on the light, sandy land, but when it comes to a hard spot it slides over, and there, sooner or later, will be found a patch of thistles. Look to your points.

Better Days for Farmers.—One of the hardest things to do is to make a valuable experiment in the field of agriculture. He who can put a question fairly and squarely to Nature, and wait perhaps a lifetime for the answer, is more than one man picked out of ten thousand; but upon such men the progress of our agriculture depends. There are but few ways to extend the domain of the known as regards farm practice, and the leading of these is by experimentation. It is no wonder that the growth of agricultural science has been slow, and there is, therefore, great reason for rejoicing at the present time. In the first place, the several agricultural colleges have been long enough established to have reared up a considerable number of men who are able to comprehend the meaning of accurate, trustworthy, and conclusive experimentation; and, secondly, the experiment stations are becoming firmly rooted in the hearts and sympathies of the people for whom they were established to assist. While yet young, and necessarily imperfect, they are growing, and before them much of ignorance must vanish, as the light of thoroughly established facts rises as the morning sun.

SUGAR IN TROPICAL AMERICA.

I. N. FORD.

The Spanish and Portuguese adventurers, who were the pioneers of colonization in the New World, were not interested in agricultural pursuits. They were gold-hunters, bent upon rapidly enriching themselves. They employed the natives in mining operations, and in the West Indies exterminated them by forced labor. It was not until the English, French, and Dutch settled in the small islands which the Spanish had not occupied that sugar-cane was successfully cultivated. After the sixteenth century the Northern races of Europe established themselves in that quarter, and, for purposes of trade, developed the productive resources of the islands. They began with tobacco and cotton, and ended with coffee and sugar.

In 1640 the sugar industry was introduced into Barbados, from Brazil. From Barbados it was carried to the other Antilles, large and small, as the most remunerative industry of the tropics. The first African slaves received in the West Indies and Brazil were employed in mines, but it was mainly in the interest of sugar and coffee planters that negroes were taken into port and sold in overwhelming numbers during the seventeenth and eighteenth centuries. Emancipation exposed the British Islands to ruinous competition with Brazil and Cuba, where slavery was retained for a generation. While Jamaica and Guiana planters were experimenting with free labor, and importing coolies, Brazil established its supremacy as the chief coffee-producing country, and Cuba acquired a marked advantage in supplying the United States with sugar.

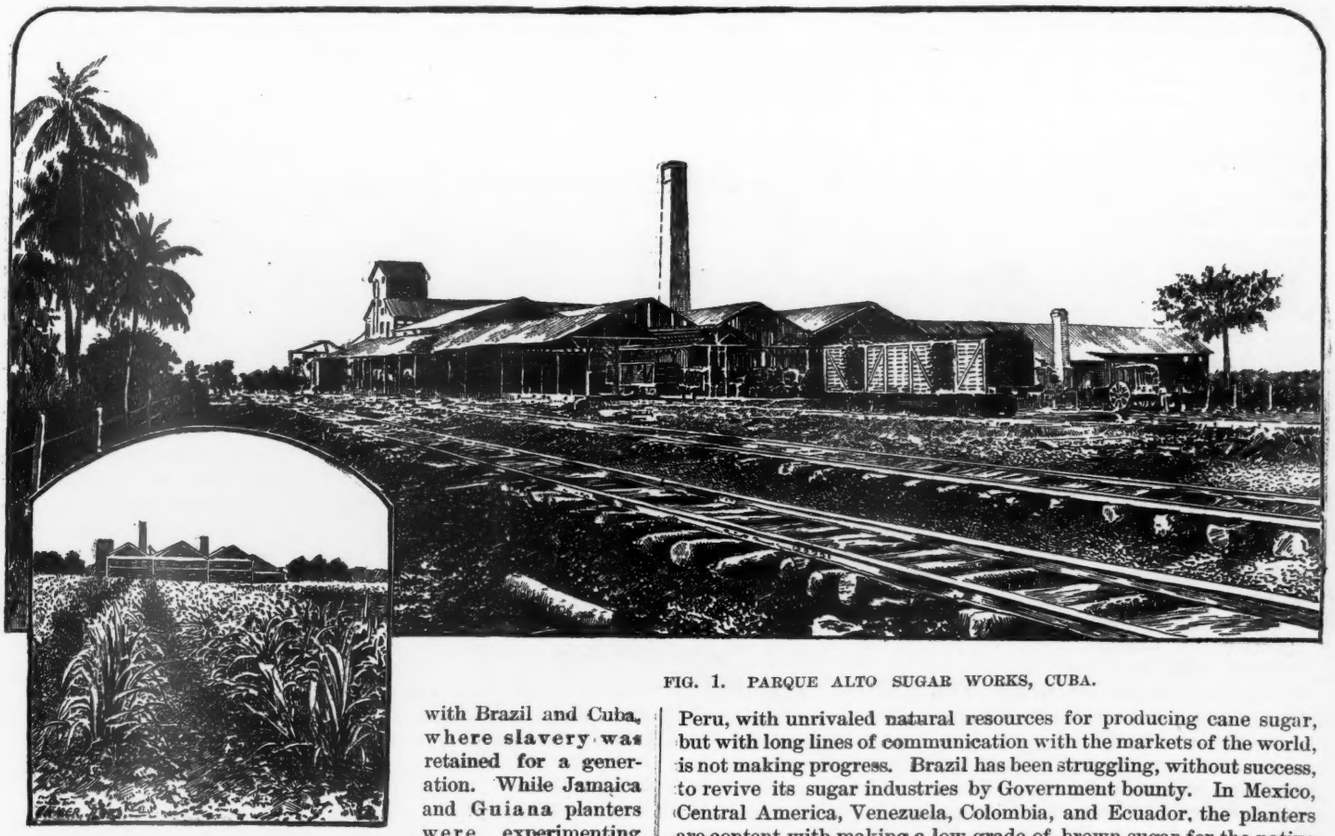


FIG. 1. PARQUE ALTO SUGAR WORKS, CUBA.

A striking contrast is offered in the fortunes of these two tropical industries, which were dependent upon slave labor. Coffee could be produced in the East Indies and in tropical America, but not in Europe. Cane sugar has been exposed to competition with beet sugar, an industry developed with marvelous rapidity during recent years under the protection of bounties paid by the Governments of Germany, Austria-Hungary, France, and Belgium. The total crop of European beet sugar, as estimated by Mr. Licht, the statistician, was 3,600,000 tons for the year ending July 1, 1890. This was an increase of 800,000 tons over the product of the previous season, or 200,000 tons in excess of the crop of the Spanish West Indies. Beet sugar has virtually driven cane sugar out of Europe, and is now threatening to displace it in the United States. Out of a total production of 11,556,000,000 pounds for the world, 7,100,000,000 represents European beet, and 4,456,000,000 tropical cane, divided as follows: Spanish West Indies, 1,340,000,000; other West Indies and Guiana, 786,000,000; Brazil and Peru, 360,000,000; Louisiana, 250,000,000; Hawaii, 240,000,000; East Indies and Africa, 1,480,000,000.

The general effects of this competition have been, first, the closing of all great markets, except that of the United States, against the export of the cane sugar of tropical America; and, secondly, the destruction of the industry in countries where financial resources were lacking for the introduction of improved machinery on a large scale. Before the war in the Union the American market was supplied largely from Louisiana and the British West Indies, the bulk of Cuba's product being taken by Europe. During and after the war a vacuum was created, and the Spanish West Indies filled it, their sugar being diverted from Europe. Of the importations of sugar into the United States for 1890, about forty-three per cent. came from Cuba and Porto Rico, thirteen from the British West Indies, eleven from Hawaii, four from Brazil, and other countries on this continent, and eleven from the East Indies; and the remainder, eighteen per cent. represented European beet. The West Indies are the chief source from which the American market is supplied, and the bulk of their product cannot be sold elsewhere. The planters have been forced to reduce the cost of manufacture one-half, to introduce improved mechanical processes, and to abandon inaccessible estates involving high rates of transportation. Outside of the West Indies the industry is declining under the pressure of low prices. Peru, with unrivaled natural resources for producing cane sugar, but with long lines of communication with the markets of the world, is not making progress. Brazil has been struggling, without success, to revive its sugar industries by Government bounty. In Mexico, Central America, Venezuela, Colombia, and Ecuador, the planters are content with making a low grade of brown sugar for the native population, and raw material for rum.

Sugar-cane may have been indigenous in tropical America, but the varieties now under cultivation have been introduced from the East Indies and the Pacific Islands. In the West Indies the red and green canes of China and India are seldom seen, the stalks being ordinarily golden yellow, or purple-streaked. It is a perennial grass, having a knotted stalk, with joints, from which leaves shoot out. The joints are sometimes eight or nine inches apart, and then again much nearer together. The last one is known as the arrow, and is tipped with a flower. Under cultivation the cane is not allowed to flower, since seeding exhausts the juice which is required for sugar. Propagation is effected by cuttings planted either in holes or in furrows made by plowing. The cuttings are set in holes two feet apart, several of them together, and the furrows are ordinarily three feet apart. As the new canes grow the furrows are weeded and banked, the lower leaves being stripped off at maturity, and covered about the roots. The cane will be ready to be cut in twelve or fourteen months, and will stand in some countries for six years, and in others for twelve, fifteen, or even twenty years, but with a diminishing crop for protracted periods. When the stalk is cut off

the stump sends out ratoons or sprouts, which yield second and third stalks the same year; but this is a process of cultivation most exhausting to the soil.

Cane requires intense heat, a moist, equable climate, and rich soil. Rain it must have, but not during the final period of development. While protracted drought early in the season is almost fatal, dry weather at the close is needed in order to sweeten the juice. In countries like Guiana and Peru, where the fields are irrigated, the supply of water is under control, and can be furnished, or withheld, as the conditions may require. Cane grows most luxuriantly on the seacoast, where the air is laden with moisture, but it can be cultivated at altitudes of two thousand or twenty-five hundred feet. The soil has to be constantly enriched and kept in motion. In the West Indies the refuse after grinding was formerly carried back to the fields and plowed under as the cheapest and best fertilizer; but in all large sugar works this is now burned as fuel, for the sake of economy, and the ashes have a greatly-diminishd value for enriching soil. Stable manure and artificial fertilizers are used in Cuba and Barbados, and in Guiana recourse is had to green-soiling; indigo, castor-oil plant, and beans, being grown and turned under with the plow after their crops have been gathered.

The development of beet sugar has been largely promoted by the thoroughness with which the agricultural classes in Europe have been trained by the technical schools in methods of culture, qualities of soil, and virtues of fertilizers. This work has been neglected in the West Indies. Many of the varieties of cane under cultivation have degenerated, and fresh stock from the Pacific Islands is required. Some kinds do best in dry soil, and others are adapted only for moist and rich soil. Certain salts are drawn into the cane greedily, to the detriment of the sugar, and others are urgently needed. There is the same necessity for scientific analysis of soils for cane as for beet, and, with painstaking observation and selection, the qualities of the cane can be improved and rendered permanent. All these technical questions, which have been exhaustively considered in Germany, have been neglected in tropical America. This is one of the chief causes of the decline of the cane-sugar industry under the pressure of competition from Europe.

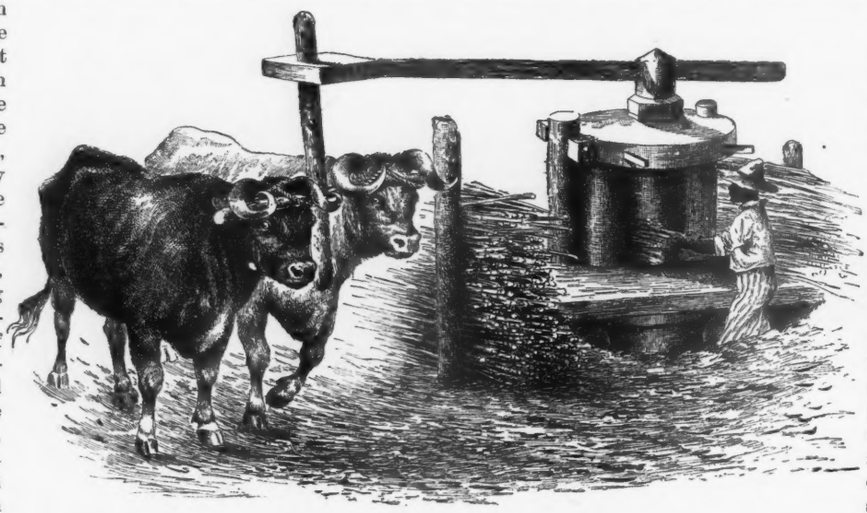


FIG. 2. TRAPICHE WITH OX-TEAM.

In the manufacture of sugar there are four general processes: (1) the extraction of the juice from the cane; (2) the removal from the juice of everything except sugar and water; (3) concentration or the separation of water from sugar; (4) curing or purification of the sugar. These processes are conducted in tropical America by the crudest and most primitive methods, as well as on scientific principles, and with highly-improved machinery. In Ecuador, Western Venezuela, Central America, and many Mexican States, the trapiche is still used. This is a pair of clumsy wooden rollers, operated by a pair of oxen, or by a horse, the cane being crushed and the juice collected in a trough. Less than fifty per cent. of the sugar is extracted. The juice is run through a coarse strainer, and boiled in open kettles beyond the point of granulation. The final process of curing is either drainage or claying. The contents of the kettles are either allowed to drain slowly in casks with perforated bottoms, or are poured into inverted cones and covered with a batter of mud, the water gradually percolating, and carrying with it impurities of the sugar. Mud bedding is commonly practiced in the hot lands of Michoacan, Mexico, which I visited last year; and near Maracaibo sugar is cured in this way. The product is a coarse, brown sugar, which in Mexico is sold as pilon to the natives, at two cents a pound. Large quantities of it are used there and in Central America in the distillation of cane brandy, a spirit of unusual fire. In Costa Rica the same grade of cheap sugar is employed as the basis of the rum manufactured under a Government monopoly. The processes of manufacturing sugar in Cuba, Barbados, and British Guiana involve the use of a costly plant. At the Soledad works, near Cienfuegos, I witnessed, a few months ago, the perfection of modern mechanical devices for milling and boiling cane under constant laboratory tests by skilled chemists. Long trains of open cars, running on a narrow-gauge railway through the plantation, delivered the cane at the mill. Negroes unloaded the cars by throwing the cane upon a carrier, traveling up a long incline to the first mill. Between iron rollers, weighing fifteen tons, and set close together, the cane was broken up, and about sixty per cent. of the juice was drawn off. Two additional rollers took up the cane and squeezed out of it fifteen per cent. of the juice. The refuse was carried by moving conductors to the furnaces, and automatically dumped, being dried by the intense heat, and consumed as rapidly as it was fed. With the aid of these traveling conductors two men took the place of eighty workmen in disposing of the refuse. This was the only fuel used, and served to keep all the complex machinery in operation.

From the mills the juice, after being roughly strained, was pumped into dessicators or large tanks, where it was treated with lime. The acid being neutralized, the albumen, when cracked by steam and brought to the boiling point, coagulated, and was removed. The clarified juice was then pumped into the first of three great boilers, or vacuum pans, from which the air was exhausted by steam-pipes. In the first boiler the temperature was 200°, in the second 180°, and in the third 150°, with corresponding vacuums. By this triple effect the juice was boiled to a syrup, containing fifty per cent. of water and fifty per cent. of sugar. The sugar crystallized in two large strike-pans, from which the contents were constantly sampled and tested in the laboratory. The most expert Chinese workmen were in charge of these pans. The sugar was rapidly cooled, and carried into a series of centrifugals, in which its color was changed. As the contents of the iron basket revolved, the molasses flew out through holes in the sides. When the process was completed eighty-five per cent. was sugar, and fifteen per cent. molasses. The sugar was collected by machinery, carried to the bagging and weighing rooms, and transported thence by railway and steam lighter to the wharves of Cienfuegos, for shipment to New York. The product of these works was 14,000,000 pounds during the last season. That of the Constancia, in the same district, was 40,000,000 pounds.

At Matanzas more molasses is made than at Cienfuegos, but nothing is wasted by Cuban planters anywhere, in any process of manufacture. The centrifugals divide the syrup into sugar and molasses of the first grade. The molasses is then worked over with more syrup, and the centrifugals divide the product into sugar and molasses of the second grade. The second molasses is carried through a distillery, which is usually one of the adjuncts of a sugar-mill, and converted into several grades of rum. In these hard times planters cannot afford to lose anything. The day of the small sugar manufacturer has already passed in the West Indies. In Cuba the large plantations are in the hands of capitalists, who have been compelled, in many instances, to take the property and manage the business, in order to secure loans made to the original owners. Sugar-grinding is conducted on a large scale by them, and small planters who need money for raising their crops are helped along early in the season, with the understanding that their cane will be brought to the large works to be converted into sugar. In the Danish island of Santa Cruz all the planters send their cane to a Government mill to be ground.

In Cuba there is destined to be a survival of the fittest. Those planters who can make sugar in the most scientific way, and with the least waste and loss, will remain in the business. Others will either go under, or will be reduced to the subordinate rank of cane-growers. Two Cuban plantations, one near Matanzas and the other

in Cienfuegos, are operated on the diffusion principle. The cane, instead of being crushed by rollers, is cut into small sections, and the sugar is worked out of it by seven changes of water, the aggregate result being the extraction of nine hundred and ninety-two parts of the one thousand. More labor is required by the diffusion process, and coal has to be used for fuel; but one of the most experienced planters in Matanzas informed me that the increased expense was more than made up by the larger percentage of sugar obtained from the cane. The proportion is twelve to ten in favor of diffusion and against milling. This new process has been employed with varying results in Louisiana, Martinique, and elsewhere, and has been introduced tentatively in Cuba. About one hundred and forty-three tons a day are produced by this method in the plantation owned by Count de Ybanez, and with improved machinery and cheap coal, which will be secured under the reciprocity treaties, it is possible that diffusion will be generally adopted on the largest estates. It would be a singular result if the characteristic process of making beet sugar in Europe were employed by cane planters as the last resort, in order to enable them to cheapen and to enlarge their product, and to regain the ground which they have lost during the last generation.

The future of this tropical industry depends, to a large degree, upon the success of the West Indian planters in extracting a larger percentage of sugar from the cane than formerly, and in cheapening the product by improved machinery and scientific methods. Mexico, Central America, Venezuela, Colombia, and Ecuador, with primitive appliances and unskilled Indian labor, can hardly do more than supply the home markets with inferior grades. Peru has the advantages of irrigation, an equable climate, and coolie labor, and may succeed in developing a great industry. In Brazil the negroes are inferior workmen, and the modern methods of manufacture exceed their capacity. In the British West Indies, Barbados and Trinidad are conducting the industry most intelligently, the cultivation of the fields with subsoil plows being thorough, and technical knowledge being displayed in the choice of stock and the employment of chemical manures. Jamaica, Guadaloupe, and Martinique are making every year more rum and less sugar, and are losing ground; but British Guiana, with a complete system of irrigation and field drainage, and with Chinese labor, is steadily enlarging its productive resources. The West Indies as sugar countries are rapidly becoming dependent upon Asiatics as mill-workers. In Cuba, as in Guiana, the blacks are employed in the fields, and the coolies in the complex and delicate processes of manufacture. With this superior class of labor, and with the advantage of short lines of communication with the United States, Guiana and the Spanish West Indies may succeed in surviving the deadly competition of the European beet. Otherwise this product may supplant cane sugar.

FIG. 3. NEGROES AT WORK ON THE TOLEDO ESTATE.

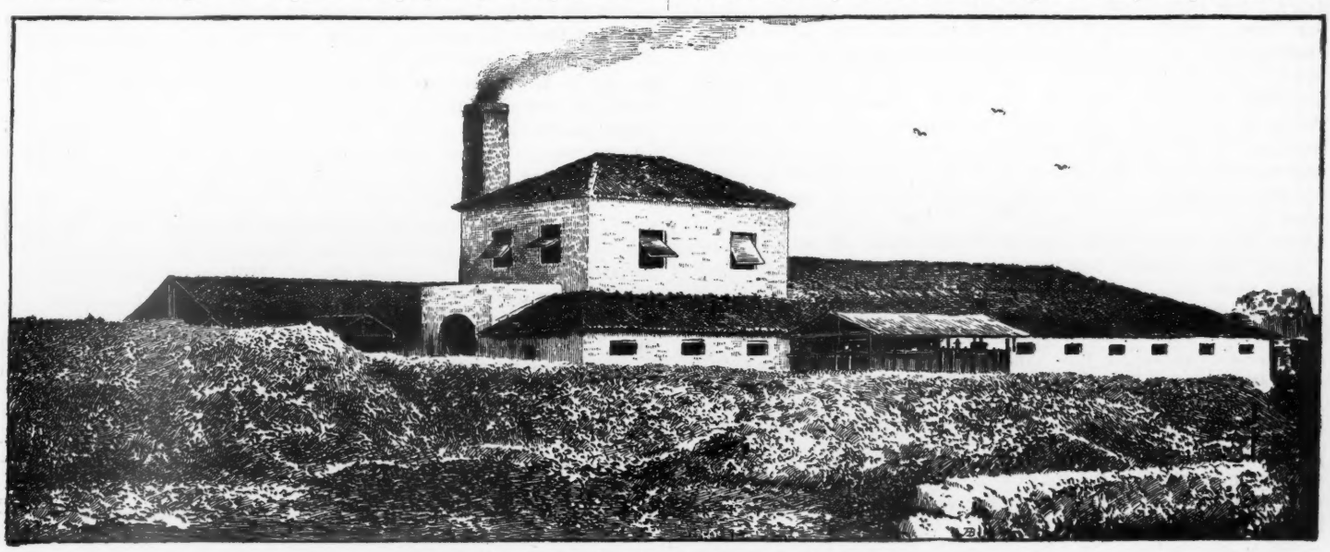


FIG. 4. DISTILLERY ON THE TOLEDO ESTATE.

[The accompanying illustrations, engraved after photographs, represent some characteristic features of the tropical sugar industry. Fig. 1 shows a view of the Parque Alto Sugar Works with cane cars at entrance of grinding shed. In Fig. 2 is seen the Trapiche with ox-team—the primitive method employed in milling sugar in Ecuador and other tropical countries. In Fig. 3 are seen negroes at work on the Toledo estate near Havana. Fig. 4 represents a perspective view of a distillery on the Toledo estate used for working their second grade of molasses.]

FIFTY YEARS OF DAIRYING.

HENRY STEWART.

Half a century is a long time to look forward to, but comparatively a short time to look back upon. Time is to be measured by the things which happen, rather than by lapse of years, and, thus measured, the fifty years during which the AMERICAN AGRICULTURIST has been cultivating so assiduously and successfully its special field of usefulness are equal to any five centuries which have preceded them, considering the advancement of science and practical industry. And it must be admitted that in the dairy a great advance in knowledge and practice has taken place during all these years. Fifty years ago the writer was a child of eleven years, and was then initiated into the mysteries of the dairy by his mother, who was a most excellent manager of a specially well appointed dairy. I say mysteries, for it was a mysterious business then to make butter and cheese and feed cows as we now do. There was no guide but the knowledge handed down from the parents to the children; nothing known of why this or that should be done, nothing of the nature of special foods or the functions of the cow; or the nature of milk: or of the butter or cheese, beyond the mere fact that, as Job remarked, "the churning of milk bringeth forth butter," and that one could beat the milk laboriously in the churn for three or four hours and in time get the butter out of it.

But there were some things practiced in those days which need yet to be harped upon, with "line upon line and precept upon precept" to enforce them upon neglectful dairymen. And the principal one of these is the golden rule of cleanliness. It is certainly true that very much bad butter was made then, as there is now, but the fact that quite as good butter was made in some dairies, in spite of the absence of all the knowledge we now have, goes to show that, after all, the present knowledge and conveniencies we have tend rather to lessen the labor than to better the product. The cleanliness prevailing in the best dairies of fifty years ago is not surpassed in the best of them to-day, and this virtue is unquestionably the basis of good butter. Certainly I have not seen in any of the very best dairies anything that surpassed that of my mother, and I suppose in all the best dairies of that day the same system of neatness was observed. There were gutters behind the cows, the floors were paved with smooth stone and always swept clean with the old-fashioned birch brooms before the milk maids went with their wooden pails, with one protruding handle, to milk the cows. As the milk was brought in large buckets to the house or dairy it was poured into the great churn, and the upright handle was kept in motion by a relay of the maids from early in the morning until noon, when the butter was ready for the large bowl in which it was worked. How curiously I watched all the processes, and how clean and white the woodwork and floor of the dairy, the pails and churn and bowls were made by scrubbing and scalding through the afternoon, when, only, the work of the day was accomplished. The butter made into pound prints the next day was wrapped in clean cloths, packed in wooden boxes, which were taken in a wagon somewhere, I don't know where; but I know about twenty cows required the work of two or three "maids" and one man, and pretty near the whole of the day, week in and week out.

Gradually, since that time, all that we know now has been learned by a long series of patient study and investigation. We now know to an ounce how much food a cow requires per day; what the best foods are; how the milk is produced; of what it consists; how its parts are most easily separated; how it is affected by food, by temperature and other contingencies; and how its products can be made and managed in the best way. One by one various improved devices for the more easy manipulation of the milk, and the product of butter and cheese, have come into use. We have the most effective apparatus for separating the cream, for working up the milk, for making butter, for regulating temperature, and now, after all, the "*ultima thule*" of the dairy processes has been reached by a machine into which, as into the old wooden dash churn of our mothers and grandmothers, the new milk is poured, and, instead of half a day, a few minutes suffice to get the butter pouring out of a spout into the receptacle provided for it.

And considering what we now know of the milk and the nature of the fat in it, it does certainly seem as if we have reached the end of all mechanical contrivances for the manufacture of butter, and of cheese as well. And more than that, by the creamery and factory system we have totally abolished all the domestic labor which used to fall wholly upon the women of the days that are past. Then the butter and cheese making was *the* household business. Every thing gave way for this work. The house was built and arranged for it, or at least the working part was, and from dawn to eve the domestic cares were absorbed by the dairy. Now all is changed. The farmer's wife is relieved from these cares; the daughters take no note of the cows, or the milking, or the churning. Men do it all, and, as soon as the milk is sent off, or quickly set in the portable creamery, the work is over.

This is a great point attained. Freedom from tiresome labor; and more satisfactory profit. Emancipation from entanglements, which affords opportunities for mental culture and the better training of the farmer's family, and which lifts the farmer and his wife and children into a higher sphere of existence and renders rural life more and more the blessing which it really is.

But as years roll by human nature remains the same. There are those who bury their talent in the earth, or wrap it in a napkin, and neglect the valuable uses of it as in the ancient days; and so there are dairymen and farmers who keep cows, who have totally neglected all the advancement of the present day. They worry along "with all their imperfections on their heads" and get no benefit from the new condition of things. Such "never learn and never forget;" but it is for these that others study and learn and strive to teach what they have learned, and the pages of the AMERICAN AGRICULTURIST are as necessary as they were when they first emerged from the press. Men come and go, but the work of teaching remains forever, and fifty years from now no doubt the AMERICAN AGRICULTURIST will find its labors not in vain, and its exhortations to practice the better ways as necessary as at the first.

THE CATTLE INDUSTRY OF THE SOUTHWEST.

RALPH S. TARR, TEXAS.

Traveling along the sub-humid belt of Texas westward toward Mexico, and following the line of the Texas-Pacific railroad, one's attention becomes soon attracted to the immense slaughter of cattle by the railroad. As the cattle are practically allowed to roam wherever they choose to go, being rounded up at certain times in the year and segregated on their respective ranges, they often find themselves on the track in front of a locomotive, become bewildered, and, instead of running down to one side, slowly amble off along the track. The continued whistling of the engine seems to increase their confusion. Soon they are tossed aside by the engine, and left maimed and helpless, to die slowly, and in agony, by the side of the track. The owner, when he discovers them, can collect damages from the railroad. There are thousands of these dead steers along the line of the Texas and Pacific railroad, and at times the air is filled with the sickening stench of their decay. The buzzards stand about sleepily, gorged with their revolting food. These dead creatures are never stripped of their hides, nor utilized in any way. If the slaughter continues, the industry of bone collecting along this railroad will be a profitable one.

The deadly work of the locomotive, however, is a trifle compared with the mortality resulting from starvation. When cattle raising was the great industry of the Southwest, that region seemed to possess boundless resources for it. Millions of bison had fed upon these ranges for countless ages, and cattle were their natural successors. But the pioneers miscalculated, or did not calculate at all. True, great herds of bison had fed on the plains and plateaux, but they were migratory, and it might be years before they returned to the same spot. Meantime, the grass could grow. So the ranchmen turned their herds loose to feed year after year on the same ground, and the tall, nutritious grama grass became shorter and shorter, until the roots only remained. What the country was before cattle were placed on the ranges, may be seen even now fifteen miles or more from water. There the grass is high and thick, but nearer the springs it becomes shorter. Near the watering places are trails crossing in various directions, but all generally leading to the springs. Farther yet these trails converge and become well beaten paths, over which hundreds of cattle travel daily for water and back again to their scanty feeding grounds. There is no grass, but some of the tufts cropped close to the ground show where it would be, if allowed to grow. Not alone by eating down to the very roots is this grass prevented from growing, but by the continual tramping of the cattle much of it is destroyed, even the very roots being killed.

To escape the threatened death of thousands, great herds have been, and are still, driven from the ranges to market. The trail of such droves is often marked by dead and dying animals,

too weak to keep up with the rest. It seems horrible, this suffering of helpless creatures, yet the ranchmen can hardly be blamed. The condition has come by degrees, at first unexpectedly, and now there is no help for it except that which may come in the way described. Cattle, in these regions, are now held at a loss, and to sell them means a still greater loss, yet this and death are the only immediate solutions of the problem. The cattle industry must change. The time of great ranges and uncared-for herds is past. Fewer and better cattle must be kept where they can be protected from the danger of starvation. Already some of the more successful and advanced cattlemen are adopting this plan. In parts of Texas the natural conditions are such that by the possession of small tracts large tracts can be controlled. In such cases the conditions for successful cattle raising are possible. This method is, however, unfair, and it seems almost certain that our national land laws must be changed. There are large tracts which can never be used for anything but grazing. These should be determined and placed on sale in tracts of reasonable size. The character of the land must be fully determined, for, otherwise, valuable irrigable tracts might thus be disposed of at merely nominal prices. By selling or renting large tracts of arid land, the government will obtain some profit from what is now used or misused by cattlemen who pay nothing for it and get the least possible good out of it.

FIG. 1. HEREFORD CALVES IN FENCED PASTURE.

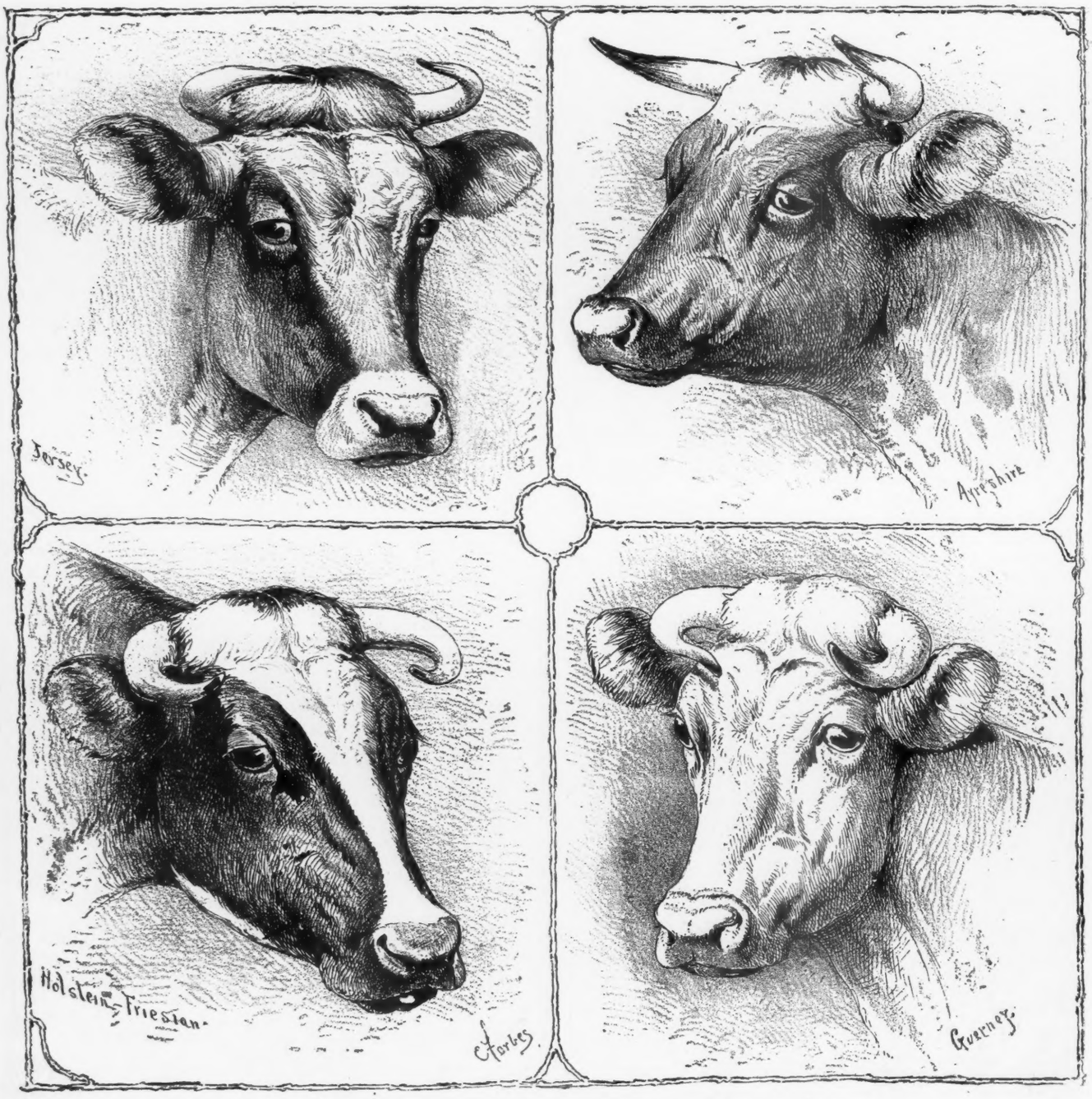
If it is ever possible to obtain land in this way, some other means must be provided for the support of the cattle than the scanty desert grass. Large tracts of suitable lands may be irrigated and seeded with nutritious grasses and forage plants, with which to feed the cattle in time of need. In Arizona, herds of cattle are turned into alfalfa fields to the profit of their owners, and in New Mexico this is followed to a less extent. With well-bred cattle, in fenced ranches, and a limited amount of winter feed, cattle-raising in the Southwest can again be made a profitable industry. To supply grasses and other forage crops adapted by nature to these vast arid stock ranges the Department of Agriculture, under the able supervision of Dr. George Vasey, has established grass experiment stations where many kinds of native grasses are cultivated annually and tested in various ways. Naturally such experiments cannot be productive of immediately practical results, but, nevertheless, the most encouraging prospects have been realized. In fact, it is quite certain that in the not distant future grasses and other forage crops suited to all the conditions of climate and soil will be discovered and extensively utilized. Grasses that have sufficient vitality to bear continuous drought and close feeding are chiefly the kinds needed until a regular system of pasture feeding like that in the more thickly settled Northern States is adopted. Such an arrangement, however, can never come into vogue on an extensive scale until a proper system of universal irrigation is practiced, because the succulent grasses of permanent pastures cannot bear very protracted periods of drought, especially if they are closely fed. [In the accompanying very typical illustrations Fig. 1 represents a group of young Herefords peeping between the barbed-wire fence of an inclosed range, while Fig. 2 shows a large herd of cattle "rounded-up" on the open range.]

FIG. 2. CATTLE ROUND-UP IN TEXAS.

AMERICAN CATTLE OF HALF A CENTURY.

GEO. A. MARTIN.

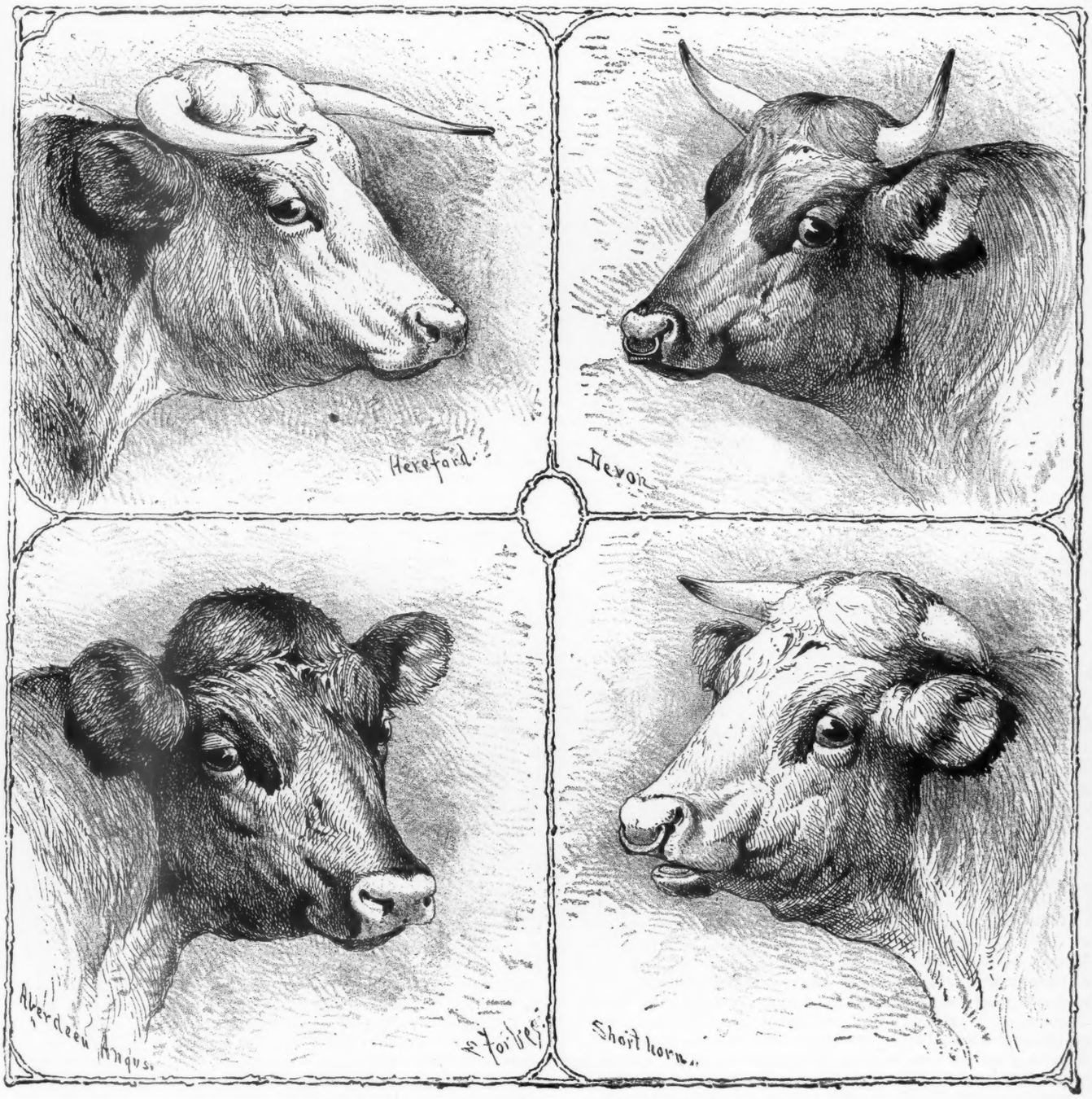
During the last fifty years the cattle industry of the United States has experienced a growth and development as wonderful as that of any other branch of American enterprise. Fifty years ago the great plains and parks of the West, which now contribute so largely to the beef supply, were grazed only by herds of wild bison. Cattle raising for beef, or the dairy, was confined to the Seaboard and Middle States. In fact, for many of the earlier years of the period Ohio was the leading State in this business. Nearly all the cattle of those years were "natives" of no particular breed. True, a few enterprising gentlemen had imported and bred from fine improved stock, but such breeding was generally looked upon as an expensive amusement for the rich, rather than a steady and profitable business for the farmer. Of the pure-bred cattle of that day the Shorthorn was the leading breed in point of numbers and popularity as it has continued to be ever since. The Devons had been introduced still earlier, and had many admirers; a few Herefords had been quite recently imported, by W. H. H. Sotham and Erastus Corning, and a limited number of Dutch cattle were owned and bred by L. G. Morris, near New York city. Ayrshires were imported in 1831 and, during the subsequent ten years, had become deservedly popular so far as they were known. Individual specimens of Jersey, Galloway, and possibly some other British breeds, were found in the Eastern States. But all of these detracted but little from the growing interest in the Shorthorns. This interest had been awakened by the Kentucky importations of 1817; at a later date, Hon. George Vail, of Troy, N. Y. had brought over some fine Shorthorns from the historic herd of Thomas Bates of Kirkleavington. But the largest importations and most important in their influence on the cattle industry, were those of the Scioto Valley, Ohio, Importing Company. In 1834 this enterprising association had brought over nineteen pure-bred Shorthorns selected from the best herds in England. During the next two years further importations were made, the cattle landing in New York, going thence by Erie canal to Buffalo, and by lake to Cleveland. In 1836 nearly the entire herd was sold at auction, the remainder being sold the next April. The fifty-eight head, constituting the entire herd, brought $50,744, an average of $874 per head. This was



LEADING AMERICAN DAIRY BREEDS.

justly regarded as an enormous price, for that day. Yet in less than forty years—at the famous sale of the New York Mills herd, Sept. 10, 1873, twelve Shorthorn cows and heifers sold for $239,250, an average price of $19,937 per head. But the importations and sales of the Ohio Company, and of the spirited individual importers stimulated the taste for pure-bred stock, and gave impulse to the movement which made the high prices of the later sale possible.

Fifty years ago cattle were driven to market on foot. Great droves were made up from the blue-grass pastures of Ohio and Kentucky, or the more remote prairies of Illinois, and driven by slow and easy marches over the country roads to Albany, New York, Philadelphia, and other Eastern markets, generally arriving at their destination in better condition than when they started. But the wide-awake Western men were not slow to perceive the advantages of slaughtering and packing beef near the feeding grounds. Early in the half-century the business was established in Chicago, which has since grown to immense proportions. A Chicago paper of 1849 announced that "Chicago is at present the first point in the United States in slaughtering and putting up beef. There are some two or three establishments engaged in this business here, who have no rivals at any other place in the United States." We are further informed in the same article that one of the largest of these packing houses had "already slaughtered four thousand head, the present season, and will still add one thousand more to their fall's work. The average number per day, for three weeks, was one hundred and seventy-five, and one day two hundred and eighteen were killed, which is believed to be the largest day's work of the sort ever done in this country." Forty years later, over 1,600,000 head of cattle were slaughtered annually in Chicago, two of the largest houses each killing an average of 1,600, daily. This marvelous increase in the business at its principal center is a fair index of the growth of the cattle industry throughout the country.



LEADING AMERICAN BEEF BREEDS.

Fifty years ago the entire region west of the one-hundredth meridian was put down on the maps partly as "Unexplored region," and the remainder as the "Great American Desert." The few hardy explorers and trappers who penetrated its solitude found there, in places, great herds of bison grazing on the short, crisp grass. To-day, the entire region, from the Mississippi river to the Pacific Ocean is as thoroughly explored and as accurately mapped

as the Atlantic States; the bison has given place to domesticated cattle, more than thirty million head of which graze west of the Mississippi. A thousand head of fat beeves may be taken from the sage-brush lands of Montana by rail to New York, and thence by steamer to Liverpool in less time than was formerly required to move the same number from the pastures of Ohio to the Eastern markets. The improvement in quality has more than kept pace with the increase in the magnitude of the business. The American cattle of fifty years ago were mostly "natives," the descendants of pioneer importations degenerated by promiscuous and aimless interbreeding, until all race characteristics were lost. As late as 1849 of the cattle slaughtered in Chicago, already referred to, the very best dressed carcasses averaged only 660 pounds, net—about two-thirds the present maximum. But a great change has been wrought through the interest in fine, pure-bred cattle. Breeding improved cattle has become a business of commanding importance, which is pursued by a host of keen-witted, enterprising men; farmers of the more intelligent class have caught the spirit, and many of the prosperous and successful business and professional men of the great cities find their amusement in fine stock-breeding. All the older breeds have become widely diffused, and many other valuable ones have been introduced. The Shorthorns have greatly increased and multiplied; the Herefords, after a long struggle for recognition, have attained the commanding position they deserve; the Devons have simply held their own, and the Galloways have found the place they are peculiarly well qualified to fill, in the West and Northwest. Of other beef breeds the Aberdeen-Angus have become well and widely known and appreciated; the Sussex have achieved marked success, though their numbers are still restricted. The Red Polls have gained a strong foothold, and are increasing in numbers and popularity as a general-purpose breed.

Of the dairy breeds, the Ayrshires retain their deserved popularity as "the farmer's cow," while the Jerseys, Guernseys, and Holstein-Friesians have achieved such wonders in the production of milk and butter as to upset all preconceived ideas of bovine capacity. The Brown Swiss, though the most recently introduced of any, have taken a permanent place among American cattle which probably no other breed could fill as well.

The Jerseys have a singular history. For several of their earlier years in this country they were generally regarded as the "gentleman's cow," too fine for any place but the lawn or paddock of the wealthy suburban resident. It took some time for the fact to become impressed on the public mind that the Jersey is eminently well suited for practical and profitable dairy farming.

This notable advance in fine stock breeding has not been accomplished at random. Each one of the pure-breeds is represented by an organized association of its leading breeders, who guard its purity, and watch its interests with intelligent care and zeal. The American Shorthorn herdbook was established in 1846 by the self-sacrificing enterprise of Lewis F. Allen. Published at a pecuniary loss for several years, it at length reached a position of success, and its regular and frequent publication by the Shorthorn Breeders' Association, is now a great enterprise in itself. Other books of pedigree record followed, until now one is established and maintained by the breeders' association of every breed.

Great as has been the advance in the cattle industry, it is only the beginning of what remains to be accomplished. The scrub is still largely in the majority, and the scrub must go before American beef-raising and dairying can stand on the proper basis for attaining the highest success. The pitiless and primitive range system of the Far West must give place to more civilized methods, as the country settles up and the farm replaces the ranch. These and other changes for the better are rapidly going forward already. Rail and ocean transportation are being relieved of the horrors which once attended them; the silo enables the farmer and dairyman to carry summer feeding throughout the year; the United States Department of Agriculture has instituted systems of inspection which guard Northern cattle from the danger of infection by splenic fever, insures the foreign shipment of only healthy cattle, and has nearly stamped out contagious pleuro-pneumonia. Before the end of another half-century, if no backward steps are taken, the American cattle industry will have reached a position which could not have been anticipated fifty years ago. In fact, it may exceed the dreams of the keenest enthusiast living.

[In the accompanying illustrations of the heads of cattle the types of the leading dairy breeds are shown in Fig. 1, and in Fig. 2 the leading beef breeds are shown. In Fig. 3 the stockyards at Kansas City, Kansas, are represented.]

A NEW INDUSTRY.—MILK TESTERS.

L. S. HARDIN, KENTUCKY.

The new milk testing machines are creating quite a revolution in the dairy. The chief item of change is in the method of paying for milk at the factories whether the milk is to be made into butter or cheese. Formerly it was the custom to pay by the pound of milk without regard to the percentage of fat or solid contents, but under the new system the rule is to pay according to the proportion of butter-fat found in the milk. When butter is made from the milk it is easy to see that the pound of milk which produces the greatest amount of butter is the most valuable, and should be paid for accordingly. With cheese as made in this country, though the rule does not hold good in Europe, the more milk fat is worked into the cheese the more valuable it becomes, thus computing the price of milk at the cheese factory upon the same basis as at the creamery. The struggle to discover some simple and reliable method of testing milk has been going on with vigor for years. At first it was thought all the milk solids would have to be determined in order to make a fair test of its value. But practical dairymen have decided that if they can tell the amount of available fat in the milk that will settle its value so far as they are concerned. There may come a time when cheese-makers can produce as fine cheese from part skimmed milk as the Dutch now do. In such an event makers will have to look more sharply after the caseine than the fat in the milk.

The new machines for determining the fat have suggested a new industry. Students from the various experiment stations are now going about the country testing herds for pay. They charge so much per cow. When the herd is large the fee is only a few cents each, but sufficient to pay for the services of the tester. Of course one test does not determine the full value of the cow, but the student can establish a clientage, and by making periodical visits keep the dairyman thoroughly posted as to the value of the cows he wishes tested. It is to be hoped that this new industry will be found to pay its promoters. It is difficult to conceive of any point in dairying of greater importance to the dairymen of the country, and shrewd, energetic men will give it full support. Those who do not will soon find themselves forced to the rear.

THE EXPORT TRADE IN BEEF.

MISS MIDY MORGAN.

A retrospective view of the livestock trade of our country shows many changes, from high prices current after our great civil war, incident on a scarcity, to prices so low from overproduction that failure and even bankruptcy swept the western and southwestern ranches until the rise of the export business, which, presenting an outlet for our superabundant herds, caused a return of prosperity to large cattle-raising districts. While the increase of the export trade has doubtless been a national commercial advantage, and while individuals and companies have grown rich, the cost of beef to the working classes of the United States has so rapidly advanced that it is a question: Is this great export business an unmixed advantage? Another question also arises: How is it that American beef is cheaper in the populous centers of Great Britain than it is at home? In replying to these inquiries, due heed must be had to the fact that the best, and only the best, of our native and grade herds are sent across the Atlantic, both on the hoof and as dressed beef. This leaves, it is true, a fair proportion of equally choice herds for home consumption, but the residue is miserable, and speaks of bad farming and worse ranching. One cause of the wide difference in values in London and in New York is, that there is really no very poor meat in London, and the coarse parts of well-fed beeves sell at reasonably remunerative rates; whereas, in New York there is so much poor meat for sale, that many housekeepers of small means prefer to buy a choice cut from a lean Texas steer or old dairy cow rather than a coarse cut from a prize ox. This makes a serious difference in the wholesale as well as in the retail butcher business, and as these sections of the meat trade prosper or decline, so does the feeder and the ranchman have a good or bad year.

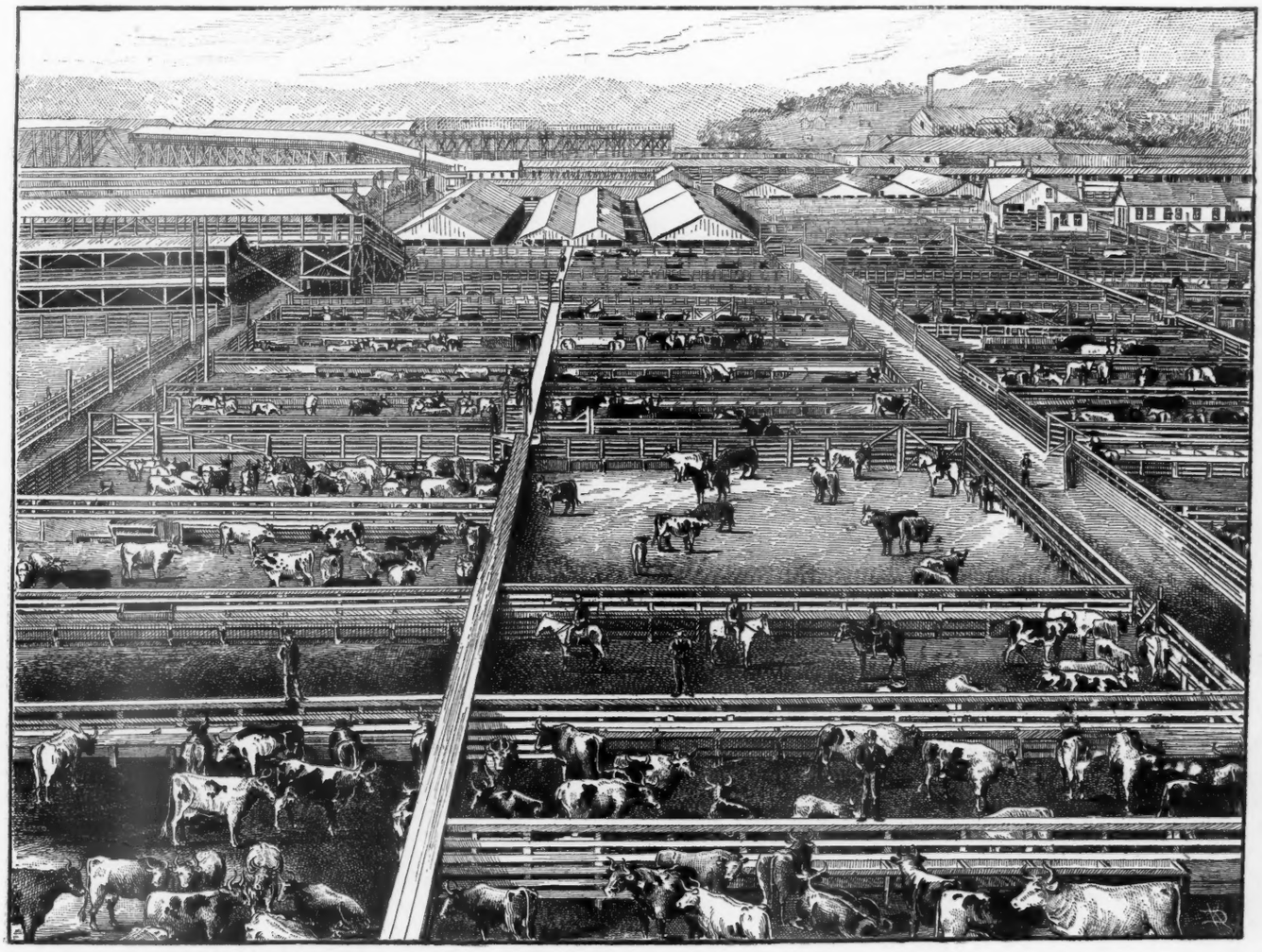
So divided is this vast industry that to consider it in all of its ramifications we must follow the career of a steer from the far West to our Atlantic Seaboard, and from thence to Deptford, Berkenhead or Greenock. A Western bred steer passes out of his breeder's hands at about thirty months. He probably finds his second owner at Kansas City, Omaha or Chicago. Some herds are

contracted for on the plains. The animal is then put to feed. In Kentucky, Illinois, Indiana and Ohio where distilleries flourish, large numbers of beef cattle are annually fattened on distillery refuse. Many weeks are consumed in this fattening process which, when fully carried out, produces excellent beef. As the prosperity of our cattle industries depends largely on our foreign markets, breeders and feeders, alike, must prepare to meet its demands, and that also at as low a cost as is possible.

Heretofore, Great Britain has taken the lion's share. France and Germany need our beef, but a steady trade has not been established with continental Europe. Dressed beef, shipped in refrigerator boxes, commands most attention thus far; fattened beeves, which pass direct into the hands of British slaughterers, stand next in order; but there is a third want coming forward.

The need of store cattle is sorely pressing on the British agriculturist. He has crops to convert into beef, but store cattle are scarce. To meet this individual phase, Canada has entered the field of competition, and annually her export business with the parent country has increased until our neighbors across the frontier have deemed it prudent to seek legislation to aid their enterprise. Some Canadian shippers have asked that American yearlings and two-year-olds be allowed to pass through Canada for Great Britain, where feeders and the representatives of other industries, tanners and dealers in all that offal produces, seem desirous of an easier inlet than now exists.

The hindrance to practically free admission into the British Isles of foreign cattle lies in the sanitary condition of the herds seeking admission. To satisfy foreign feeling our government has instituted home inspection, and now all beeves which are to leave our ports pass under veterinary inspection. This has already been of signal service to the export business. The Custom House records of the port of New York serve to show from what a small beginning our present important export trade has arisen. While the total exportation of live cattle from the port of New York for the month of August, 1876, was 155 beeves, on the week ending June 27, 1891, it was 2,429 beeves. The trade in live cattle is only a portion of our foreign business. The constant shipment of dressed beef has grown from small beginnings to great interests. On June 27,1891, the week's shipments amounted to 13,288 quarters of beef. All of these shipments were for British ports, and the quality was of the best which our herds afford. In the early days of the trade with foreign nations some shippers with little foresight sent abroad Texas cattle. This proved a failure, as European veterinary surgeons raised causeless alarm of splenic fever. Then, also, the quality of this class of beef was not good enough for the British markets, and Great Britain is our best customer. In June, 1891, a stringent order reached the veterinary surgeons, employed by the United States government for the inspection of the herds destined for export, *not* to tag, and Texas cattle, as such, were prohibited from passing out of the country. This has done much to calm and to reassure European buyers, and has had its beneficial effects.



BIRD'S-EYE VIEW OF THE KANSAS CITY CATTLE YARDS.

An idea of the extent of the slaughtering business of the country may be formed when it is considered that the slaughtering capacity of one establishment alone — that of the Eastman Co. of New York—amounts to 4,000 beeves per week, which is now being enlarged to 5,000 head. There is also a weekly capacity for 3,500 head of sheep, lambs and calves. The buildings are floored throughout with asphalt and are fire, water and grease proof. The refrigerating capacity is for 5,000 head per week. At first 220 tons of ice were consumed daily. Now the compressed ammonia artificial refrigeration is practiced, and with gratifying results. During transportation insulated cars are used. The packing is all done in the refrigerators, and these insulated cars are run on board of refrigerator barges. The refrigeration system on these barges consists in ice and brine being forced into pipes by steam power. On the ocean steamships artificial refrigeration is generally used, while on a few compressed air is in use. Refrigeration for beef is not practiced in Great Britain, as it is not needed in that climate.

IMPROVEMENTS IN FLORICULTURE.

WILLIAM FALCONER.

In no country in the world to-day is ornamental gardening making better or more widespread progress than in the United States. A pretty garden and beautiful flowers are as much necessaries of our time as are good furniture, music and current literature in our homes. The garden plat around the house is a fair indication of the character of the people who reside within. Large and elaborate grounds may be established by the decree of wealth or fashion, or be prompted by an ambition to excel, but it is to the smaller gardens of our urban and suburban cottages and farm houses that we look for the print of natural refinement and love; and the humblest cottage may bear the mark of the most tender passion and kindliest nature.

HARDY PERENNIALS.

Spring adonis, white arabis, golden alyssum, globe flowers, bleeding heart, fraxinella, lungwort, spring orobus, yellow day lily, lily of the valley, panicled gypsophila, bee balm, orange butterfly-weed, broad-leaved statice, yucca, and several others, abundant in our grandparents' gardens, are still among the commonest plants grown to-day, and unchanged. In other directions, however, marked improvements have been made.

In the *Aquilegia chrysantha* and the red *truncata* we have added new species of columbine; in the white form of *cærulea* and other new varieties, and in the intermingled hybrid host between the long-spurred species we have enriched our gardens with a beautiful race of columbines. The perennial larkspurs, under the gardener's art, are losing their identity, and Lemoine has given us a race of single and double varieties that would have astonished the people twenty years ago. Pyrethrums now are as large and double as China asters, and vary in color from the purest white to the deepest crimson. The fine varieties of the Chinese pæonias are a revelation of the present generation, and great improvements have been effected within a few years in German irises, torch lilies (*Kniphofia*), panicled phlox, clematises, campanulas, and others. The doubling of some of the old flowers has added to their worth in better form, purer color and greater endurance.

Some perennials that were in favor years ago are losing ground; pentstemons are barely hardy; Jacob's Ladder is not showy enough; spiderwort is too weedy; *Spiræa palmata* is too uncertain; the red flowering delphiniums (*D. cardinale* and *D. nudicaule*) are difficult to cultivate; *Romneya* is not hardy enough, and so on.

Many desirable new species have been added to our gardens within the past twenty years, prominent among which are *Clematis Davidiana*, *Heuchera sanguinea*, mountain fleece, Kæmpfer's irises and the Japanese eulalias. In *Ostrowskia* and *Shortia* new genera have been added to our hardy perennials. But sometimes, long-ago cultivated plants, as *Pyrethrum uliginosum* and *Ipomœa pandurata*, are resurrected and distributed again as new. In hollyhocks, there has been more improvement in the color of the flowers than in their fullness or size. While our grandfathers propagated their fine stock largely by division, or slips, we restrict ourselves to seeds. The hollyhock disease compels us to do this. The dwarf pyramidal and Japanese types, however, are new to this generation.

HARDY ANNUALS.

Annuals formed a large bulk of the treasures of the gardens of former years. Our great grandparents had zinnias, mignonette, marigolds, sweet peas, stocks, asters, candytuft, balsams, lupins, poppies, larkspurs, nasturtiums, clarkias, saponaria, etc., just as we have; and I must admit when I look upon the French marigolds, balsams, and some other annuals of to-day, and compare them with those of my boyhood's time, that they have not improved. Many of those familiar to me then, for example, *Cosmos bipinnatus*, *Cleome pungens*, *Mina lobata*, *Chrysanthemum multicaule* and *Ionopsidium acaule* are now being resurrected as novelties.

But great improvement has recently been effected in annuals. In Drummond's phlox we have now the fringed and star flowers, the large-flowered section, double-flowered varieties and forms of dwarf habit. The fine old Scotch pansies never would grow well with us, but in Trimardeau for size, and Cassier and Bugnot strains for beauty and blotching, we have eclipsed the dreams of our forefathers. The Comet race has been the greatest stride we have had in China asters. We have just secured a pure yellow scabios, a color new to these plants. In Machet we have added massive size to mignonette without robbing it of any of its fragrance. The mammoth strain of verbena is of recent years, and the pompones, carnation-striped and *robusta plenissima* zinnias are a great break from old-time types. In *Gaillardia Lorenziana*, the common form was doubled and improved a few years ago; and we now have doubled cornflowers and tufted dwarf ones. The fragrant night-blooming tobacco (*Nicotiana affinis*) a dozen years ago mostly displaced the gigantic old *N. suaveolens* as an evening beauty; and now the *N. colossea* comes to remove *N. Wigandioides* and other large-leaved varieties from their place for tropical foliage effect in summer; and in the Marguerite strain we have succeeded in rendering the carnation available as an annual.

LANDSCAPE GARDENING.

In our large private gardens of half a century ago, the laying out of the grounds was governed a great deal by the English style, without its hereditary formality. A prominent example of an English garden is that at Washington's old home at Mount Vernon, Va. Our cottage and farm flower gardens have usually been dictated by the tastes and means of the owners, and are generally a happy home for flowers, more than an example of landscape art.

Within the last twenty years, however, since lawn mowers became general and cheap, a pleasant change has come over even our country home yards. An unbroken piece of lawn suitable for croquet or tennis has now become almost indispensable. The greater variety of plants and the facilities for obtaining them, render their use more general and the variety of ways of using them is far greater than was the case a few decades ago. Suburban, as well as country residents, have not been slow to avail themselves of these means within easy reach for improving their surroundings and beautifying their homes.

AMERICAN-GROWN FLOWERING BULBS.

C. L. ALLEN.

For many years it was supposed that bulbs could not be grown in America, not only because we were unacquainted with the methods of their propagation, but because our climatic conditions were not suited to their requirements. The fact that bulbs soon disappear after having been planted in our borders, even under the best care and attention, was accepted as sufficient proof of this theory. These opinions were assented to without investigation, or without realizing the fact, now well understood, that the individual bulbs, corms, or tubers are not long-lived anywhere. When the bulb of any species has reached its perfection, it quickly disappears, and a new one takes its place. The perpetuation of the species, or varieties is effected by propagation, either by offsets or from seed.

The Tuberose bulb never produces more than one flower spike, or rather, it flowers but one season, occasionally it may throw up two spikes. It then dies and its place is filled by offsets, which are produced in great abundance, and which flower the second year. The same is true with the gladiolus. New bulbs are annually produced on the top of the old one, besides numerous small ones which appear at the base of the new bulb. Unless these are carefully preserved and replanted, the race will become extinct, as the old bulb soon disappears. The same is true of all the lilies. Some of these push out sideways from the parent. Others, and the more common class, make a new bulb inside of the old, and offsets at the base of the stems; others again form small bulbs at the base of the leaves. When these facts became understood, some of our progressive horticulturists began to question the idea of our inability to reproduce plants that would thrive as vigorously, and flower as profusely as do most of the bulbs in this country. The experiments,

begun at that time with the propagating of bulbs, proved highly satisfactory and gradually developed a new and profitable industry.

TUBEROSES.

The late John Henderson, of Flushing, L. I., was the first to undertake the growing of tuberoses for commercial purposes. This was about the year 1856. Previous to that time, and for some years thereafter, all the tuberose bulbs used here were grown in Italy, and it was there that Mr. John Henderson became interested in their cultivation; not for their bulbs, however, but for their flowers, from which he made extracts for perfumes. He commenced in what we should consider now, a very small way, but what was then considered a venture; his largest output would not exceed an acre. For a few years, notwithstanding the prejudice that most American florists had against American grown bulbs, he made it a profitable branch of his business. For several years the bulbs sold at from six to eight dollars per one hundred, the thousand price being rarely known or given. His successes soon tempted others, and, within a few years, considerable quantities were grown on Long Island and in New Jersey. So popular were the Long Island bulbs that they soon made a reputation as being the best in the market. Importations from Europe began gradually to fall off, and the home industry made rapid strides. At the close of the war, some of the dealers saw in the South a congenial home for the tuberose, and commenced its growth in North Carolina. There the season is sufficiently long for the bulbs to perfect their growth in one year from the sets, which they will not do at the North in less than two. The climate on the coast is most favorable for the development of the bulb, and the soil is, in all respects, as well adapted for its perfection. This enterprise, which was followed up with commendable zeal, has completely revolutionized the tuberose industry. The South, being able to produce as good, if not better, bulbs in one year than the North can in two, has it all in her own hands. Southern growers are able to sell tuberose bulbs at the same price per thousand as the growers at the North must have per hundred, to make the industry profitable; consequently, they have secured nearly all the business. Strange as it may appear that there should be so wide a difference in the cost of production in the two sections of country, it is easily explained. It costs more to keep the bulbs over winter than it does to grow them a season; besides, one year at the North will not quite perfect them, and two years' growth is a little too much; consequently, many bulbs are wasted. At the South, also, both land and labor are cheaper than at the North.

This lessening of the cost of production, combined with improved quality, soon turned the tide of trade. We no longer buy from Europe; on the contrary, England, France, Germany, and Holland buy from us. While the industry is not large, when compared with many others, yet it is not inconsiderable. This season there will be shipped from North Carolina direct to Europe more than four millions of bulbs.

GEMS OF THE BULB GARDEN.

THE GLADIOLUS.

Another bulb that was supposed we could not manage is the Gladiolus. Its popularity created an immense demand for French bulbs, as formerly only French florists grew them on a large scale. About 1860, Mr. E. Newbury, of Brooklyn, Conn., began their cultivation, on a considerable scale, both from bulblets and from seed. They were also grown, on a limited scale, in New Jersey. The first trials convinced their growers that the industry, if conducted extensively, could be made remunerative. Mr. Newbury's failing health compelled him to give up the business, and his stock was removed to Long Island, where all the elements are most favorable, not only for the perfection of the bulbs, but for the rapid increase. Long Island is to the gladiolus what North Carolina is to the tuberose. Nowhere else is it produced as cheaply or as well. It does not cost half as much to grow a thousand bulbs here as it does in Europe, notwithstanding the great difference in the cost of labor. This is mainly due to the methods employed here, in the manner of cultivation, in comparison to those employed there. Here all the work is done by the horse, there everything by hand. The consequence is, we have reversed the order of trade, and are now exporting annually more than double the number of bulbs we have ever imported from Europe. A more important fact is, we are selling the bulbs at less than one-half the price asked by the French growers, and our profits are greater.

LILIES.

Although largely grown in some sections of the United States, lilies have not yet found a congenial home here. This is mainly due to the lack of patience in our people. Lily culture can be made

profitable here just as soon as our florists will be content to plant a bulb, and let it remain undisturbed for three or four years, a condition of things inconsistent with the spirit of push that pervades Americans. In the Middle and Northern States the winters are too cold, and the summers too hot to grow the lily successfully. In spite of the opposition of the elements, the annual increase of production is very great. That we have, in some sections of the United States, soil and climate adapted to their requirements, there can be no doubt, nor that, when men, experienced in this culture, will devote themselves to it, this country will be able to produce lilies for Europe, as it now does tuberoses and gladioluses.

In the thermal belt of North Carolina many other bulbs can be profitably grown. The various Narcissus—millions of which are imported annually — should be produced there. There, too, would be the home for the lily, and its cultivation has been tried with remarkable success. The *Lilium candidum* is troubled with a blight in Northern sections; there it is perfectly healthy, increases rapidly, makes a strong, vigorous bulb, and, as it is in considerable demand, it should be grown. There is no reason why other species will not do equally well, especially *L. speciosum*, of which there are several varieties, most of which now come from Japan, although large quantities come from Holland.

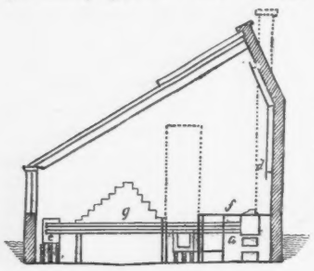


FIG. 1. CROSS-SECTION.

BEGONIAS.

Although these beautiful plants arise from tubers, floriculturally they are classed with the bulbs. When they were introduced, but a few years since, it was thought they could not flourish in the open ground, and stand our hot suns and drying winds. In this we were all delightfully mistaken. Our conditions of soil and climate have proved to be well suited to their wants. Here the begonia grows faster, stronger, flowers more freely, and makes larger tubers than in any other country. Its cultivation is destined to become a profitable industry, as the plant is sure to take a leading part for bedding purposes.

The list of bulbs that can be grown to advantage might be greatly lengthened, but enough have been mentioned to show the progress made within less than fifty years, and to show that, in whatever field of horticulture we may be called, as a country, we are capable of producing all that may be required, of the best quality and at the least cost. We have, somewhere, a soil and climate that will produce any plant that can be produced in any other country, and an ambition that will produce it in the greatest perfection.

PLANT CULTURE UNDER GLASS.

PROF. L. R. TAFT, M. S.

Greenhouses are comparatively modern institutions in America. Previous to 1840, we could boast of a few small private conservatories and forcing houses, many of which were skillfully managed, and contained collections of choice stove and greenhouse plants, that in some respects would compare well with the best in the country to-day. The forcing houses supplied such vegetables as lettuce, radishes, beans, mushrooms, and cucumbers, and of the fruits, grapes, peaches, strawberries, and pineapples. The attention given to the growth of plants for lawn planting, or for cut flowers was relatively slight. The commercial establishments of that period were small in numbers and in size; there were probably not over one hundred in the entire country worthy of the name.

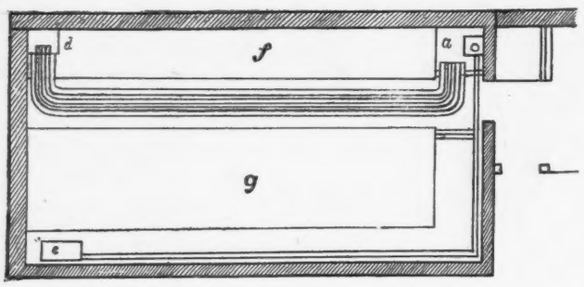


FIG. 2. GROUND PLAN OF AN OLD-TIME GREENHOUSE.

In connection with some of the parks and botanic gardens, there were several conservatories that compared well with anything to be found in Europe at that time. The forcing of vegetables for commercial purposes, was only carried on as a side issue by florists, and only to a limited extent by them.

From this period, we can trace the rise of the greenhouse industry, which has increased, until to-day, instead of the half dozen of 1800, and the one hundred of 1840, we have more than five hundred commercial florists in the country, to say nothing of the vegetable forcing houses, and the private and public conservatories. From the special census bulletin on the subject, we learn that nearly one-half of these establishments were started during the last ten years. The cut flower trade, in particular, has developed with wonderful rapidity, and in many cities has gained in a decade from 300 to 500 per cent. The florists' establishments of the country contain about 45,000,000 square feet of glass, covering more than 1,000 acres, the largest being nearly four acres in extent. They are valued at about $45,000,000, and their annual products are at least $30,000,000. No figures are at hand that give the extent and value of vegetable houses, and their products, or of the conservatories. In the construction of the houses, methods of heating, etc., the casual observer would perhaps note but few changes, and, in fact, many houses are erected to-day, that in every material respect are identical with the better houses of forty or fifty years ago. At that time they had houses with lean-to, span, and curvilinear roofs, and, although the flue was the common method of heating, hot water and steam were also used.

In order to obtain a clear idea of the houses of former times, let us turn to *Hovey's Magazine of Horticulture*, for January, 1836, and examine what is there recommended as a model greenhouse.

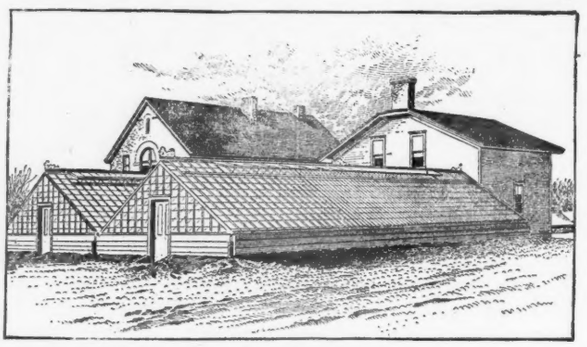


FIG. 3. EVEN-SPAN-ROOF FORCING HOUSE.

The house, a cross section of which is seen in Fig. 1, was sixteen feet wide with wooden walls, the rear and end ones being double, and packed with tan; the rafters were four and one-half by ten inches with rabbets on which to slide the sashes, which were three and one-half feet wide, and the upper and lower ones, respectively, six and nine feet in length; the glass used was five by seven inches, five rows to each sash. The house had two walks and two beds, *f* and *g*, the middle one raised, forming twelve shelves, as shown in Fig. 1, and in the ground plan Fig. 2. The arrangement of the heating apparatus was particularly interesting, as it combined the flue, hot air, and hot water methods of heating. The furnace and flue did not differ from those in use to-day, the furnace (*a*) being at one end of the house, from which the flue, passing under the middle wall, led to the chimney (*d*) at the other end of the house. The brick wall of the furnace was double, with a six-inch space; cold air was admitted into this and, becoming warmed, passed into the house through a hole at the top. The hot water apparatus consisted of a copper kettle or boiler, which was built into the furnace (*a*) directly over the fire, and a copper reservoir (*e*) at the other end of the house, connected by two four-inch copper pipes; these were placed perfectly level, one above the other, and the whole apparatus was kept nearly full of water. Altogether, this was said to have been a very economical method of heating. While copper boilers and pipes were extensively used, those of iron were more numerous, the latter being generally four inches in diameter, but sometimes they were as small as one inch.

Comparing the better class of our modern houses with the above, we shall find them much simpler in construction, with a great increase in the size of the glass, and a corresponding decrease in the size of the wooden frames. In modern forcing houses an abundance of light is the first desideratum, and, instead of a four and one-half by ten inch rafter every three and one-half or four

feet, a two by four inch rafter once in six feet, or perhaps no rafter at all, is used, and instead of there being a foot of wood for every foot of glass, as in the old houses, our modern houses have less than two-thirds of an inch in breadth of sash-bar for a foot of glass. This change has been effected by giving up the rafters and clumsy movable sash, and using permanent sash-bars not over one inch wide, while the size of the glass has been increased from five by seven to eighteen by twenty-four inches, and even larger.

The lean-to is still used, particularly by vegetable growers, and for economy in construction and heating cannot be equaled. While

FIG. 4. THREE-QUARTER SPAN FORCING HOUSE.

the even span, Fig. 3, is perhaps best for some purposes, for forcing houses, the three-quarter span, Fig. 4, is preferred. These houses are from sixteen to twenty feet in width, with a middle and two side benches. There is a diversity of opinion as to the best material for walls, but in a majority of houses they are of wood, at least above ground. A very substantial wall can be built with posts, having boards and siding outside, and matched ceiling inside. If two thicknesses of building paper are added, it will be unequaled for warmth. The ten-inch brick wall is seldom used, except in conservatories, but the twelve-inch grout wall has many friends. In the form of the conservatories, one can note a happy departure from the low "squatty" curvilinear style so much in vogue twenty-five years ago. The better modern conservatories, an illustration of which is presented in Fig. 5, are built with straight sash-bars, and of a variety of designs, according to the purposes for which they are intended, or the taste of the owner. For all classes of houses double strength American "A" glass, not less than sixteen by twenty-four inches, should be used. A cheaper grade "B" will answer the purposes of many florists, and for stove and palm rooms, or for exhibition houses, rough plate glass eighteen by thirty-six may be used. Iron is rapidly taking the place of wood in greenhouse construction; at most, the sash-bars are the only portions of the roof that should be of wood, and many prominent builders claim that the various forms of iron sash-bars, although more costly at first, are cheaper in the end, owing to their greater durability. Gas pipe answers well for purlins, posts, and braces, although angle-iron is more commonly used.

The methods of heating have undergone several changes. Fifty years ago a majority of the houses were heated with flues; thirty years later the use of hot water with pipes of four-inch cast iron predominated, and it is probable that this still holds true in the small houses of to-day. About ten years ago, low pressure steam received a boom, and a majority of the large plants put in since that time use that method. Now the tide has again changed, and careful experiments have shown conclusively that hot water, with modern heaters and small wrought iron pipes, is twenty-five per cent. cheaper than steam, and in every way more satisfactory for greenhouse heating than any methods that have been used.

With the growth of our people, and the increase in wealth, and a greater appreciation of the beautiful, there has been an ever-increasing demand for the products of glass houses. The use of house plants in the first half of the century was confined to a very few persons, but to-day they are found in every cottage, while bedding plants for lawn decoration are equally common. It is in the cut flower trade, however, that the greatest boom has been noted. In New York City the number of flower stores has increased fivefold, and in the small towns and cities an equaled growth has been noted, within the last ten years. During the half century that has witnessed the evolution of the greenhouse, the methods of propagation have been simplified and improved, so that, notwithstanding the increased cost of labor, the florists, forced by active competition, have been able to sell at greatly reduced prices, and still make handsome profits. In England and on the continent, greenhouses are far more commonly used for the growth of vegetables than with us, such crops as peas, potatoes, carrots, etc., being grown in addition to tomatoes, lettuce, cucumbers, and others that are found here. With cheaply constructed houses and a little fire heat, it is said that the income from one garden of thirteen acres "greatly exceeded that of 1,300 acres of the best English farming land." With the present rapid growth of the industry in this country, it will not be long before similar establishments will be found near our large cities. On many a farm likewise the greenhouse may find an appropriate place as a source of additional income as well as means for promoting the comforts and enjoyments of home.

THE TOMATO THEN AND NOW.

In a small but excellent work for the time on vegetables and fruits, published in New York sixty-two years ago, we find the following description of the tomato: "This is perhaps one of the most forbidding-looking plants that has been found capable of producing anything fit for the use of man. Yet its fruit, when well ripened

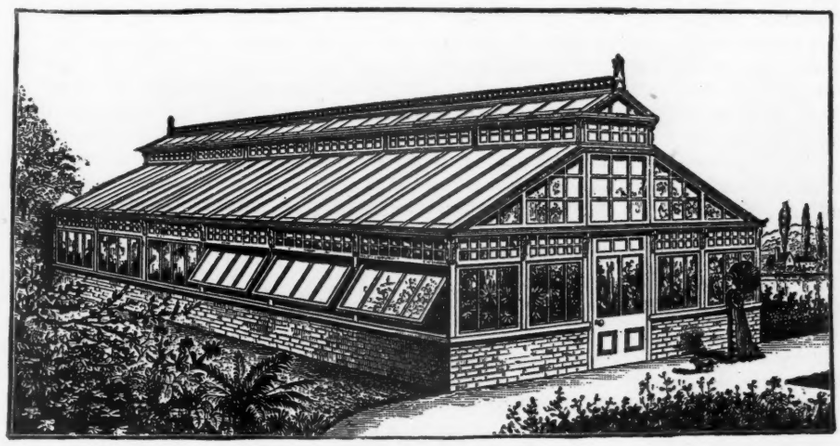


FIG. 5. MODERN CONSERVATORY.

and stewed with a liberal proportion of the pungent onion, affords a dish of which most persons can relish a small portion occasionally."

The author of the above notice of the almost despised tomato would have no doubt been surprised if some one in his day had even hinted that men then living would see the day when many thousands of acres of land would be required to supply New York city alone with tomatoes. It is also quite probable that he had not heard of the discovery that tomatoes could be preserved in hermetically sealed cans, although it had been done in France twenty years previous and a full description of the process given in a book published in New York as early as 1812. More than two centuries earlier

the tomato was extensively cultivated in Spain and Italy, and served on the table with oil, vinegar, salt and pepper, either cooked or raw, as it is served at this day. Whether the varieties cultivated at this time are better than those known three centuries earlier is a question which would be difficult to answer, but we will claim to have improved this fruit, and appreciate it all the more for our claim, whether it be true or otherwise.

ORCHARDING IN THE NORTHWEST.

PROF. J. L. BUDD, IOWA EXPERIMENT STATION.

The diverse reports relative to profitable orcharding in the Northwestern Prairie States, are not well understood by Eastern readers. In Iowa, for example, we have truthful reports of continued remunerative crops of apples, and even pears, from certain sections of Mills, Knox, Decatur, and other counties, in the southwest part of the State. The reports are also true that our climate colors up and improves certain varieties which are common to Michigan and New York. Even as far north as the 42nd parallel, on the loess bluffs of the Missouri, we have reports of good crops from such half hardy sorts as Jonathan, Grimes' Golden, Fulton, and Dominie. In North Iowa we also have the most favorable reports from certain favored spots on high bluff deposits and moraines.

On the other hand, the stories of wrecked orchards come from the many thousands of comfortable homes on our commonly rich, undulating prairies, which constitute, perhaps, ninety-five per cent. of our total area. On these rich black soils, so easily worked, the cereals, grasses, corn, clover, vegetables, the small fruits, our native trees, etc., flourish in a way surprising to many visitors. But the conditions are not so favorable for the perfect ripening of the wood of our common varieties of the orchard fruit as in the States east of the lakes, or on the higher and thinner bluffs, soils and prairie ridges of the Prairie States.

It is also true that our common varieties, originally from West Europe, are more subject to leaf diseases, and to injury of blossoms from late spring frosts than they are on ridges or bluffs with better air drainage. But the future of orcharding on the prairies is bright, as we have found some varieties as certain to ripen their wood in autumn, and with as perfect foliage as our native plums and June berries, viz., the Duchess apple, the Autumn Bergamot pear, and the Early Morello cherry, which are more reliable on the prairies than the Ben Davis is on the most favored bluff deposits.

ACCLIMATION.

We also have much conflicting talk about the final adaptation of our common, so called, American apples to our prairie conditions by seedling production. During the past thirty years we have found hundreds of seedlings that, on their own roots, were models of health and productiveness for many years. But in no case have we found such varieties hardy under propagation unless they show in leaf, bud, and fruit, descent from the East European races. In Europe we also know that the grape and the peach have not, within historic periods, extended their ancient limits of successful culture by seedling production. In my opinion, we might grow seedlings of the Rhode Island Greening, Northern Spy, and Jonathan for a thousand years, and not secure a single variety as hardy as the Wealthy, without the aid of foreign or native pollen from a hardier race.

EAST EUROPEAN AND ASIATIC FRUITS.

The success of the Duchess, Tetofsky, Peach, Whitney No. 20, Wealthy, and other varieties directly introduced from the East, or plainly derived from that race, naturally led to a methodic trial of the orchard fruits of the steppes. The Iowa Agricultural College has made a number of importations from various parts of East Europe and North Asia. We have also made use of varieties imported by the Department of Agriculture in 1870, by Ellwanger and Barry, by A. G. Tuttle of Wisconsin, and from other sources in England, France, and Germany. The intention was to sift the extended list by absolute trial on varied soils of the Northwest, and across the continent at the cold north. It has so happened that the summers and winters during the past eight years have been the most trying known to American history. Hence, we have been able to make very rapid advances in the work. Our home station is on very trying soil where no variety less hardy than the Duchess apple will long prove satisfactory, and we have had the aid of hundreds of experimenter in the west and cold north across the continent. In a very brief time with this extended trial we have reached conclusions which would have required a lifetime if the work had been confined to one spot.

In the active opposition to our hopeful views, it has often been said that the Russian apples were all subject to blight, that many of them were not hardy, that the quality of all of them was atrocious, and that there was not a winter variety for our climate in the extended lists. There is a vein of truth in all these assertions. Russia is a great and varied country, and ours is the same. We have had also some very blundering distributions. We have now learned by experience and personal study in East Europe and Asia, that the first distributions from the college were faulty to an extreme degree. The first importations were from the Coast Provinces, mainly from a point as far north as Dorpat and St. Petersburg. These all blight, and all are summer or fall apples. The interior varieties are not more subject to blight than Duchess, and many of them are good, or fairly good, keepers. As to quality, many varieties are only used in Russia for cooking. Such sorts as Silken Leaf, Marble, Hibernal, and Recumbent, are not often equaled in quality for culinary use, but for dessert they are "atrocious" if eaten when freshly gathered without removing the astringent skin. But the varieties called "good" to "very good" by Schroeder, Arnold, and Fischer, are better in quality for dessert use than our common commercial sorts. As to hardiness, they vary from that of the Fameuse to the capacity of endurance of our native trees of the extreme Northwest. Those marked with three stars in our bulletin of 1890, are hardier than Duchess, or even our native crab of the West. We already have found a greater number of varieties than we need, that succeed on our prairie soils perfectly, and bear full crops of handsome and good fruit, ripening from the season of the Early Harvest to that of the Willow, and we are continually adding to the list.

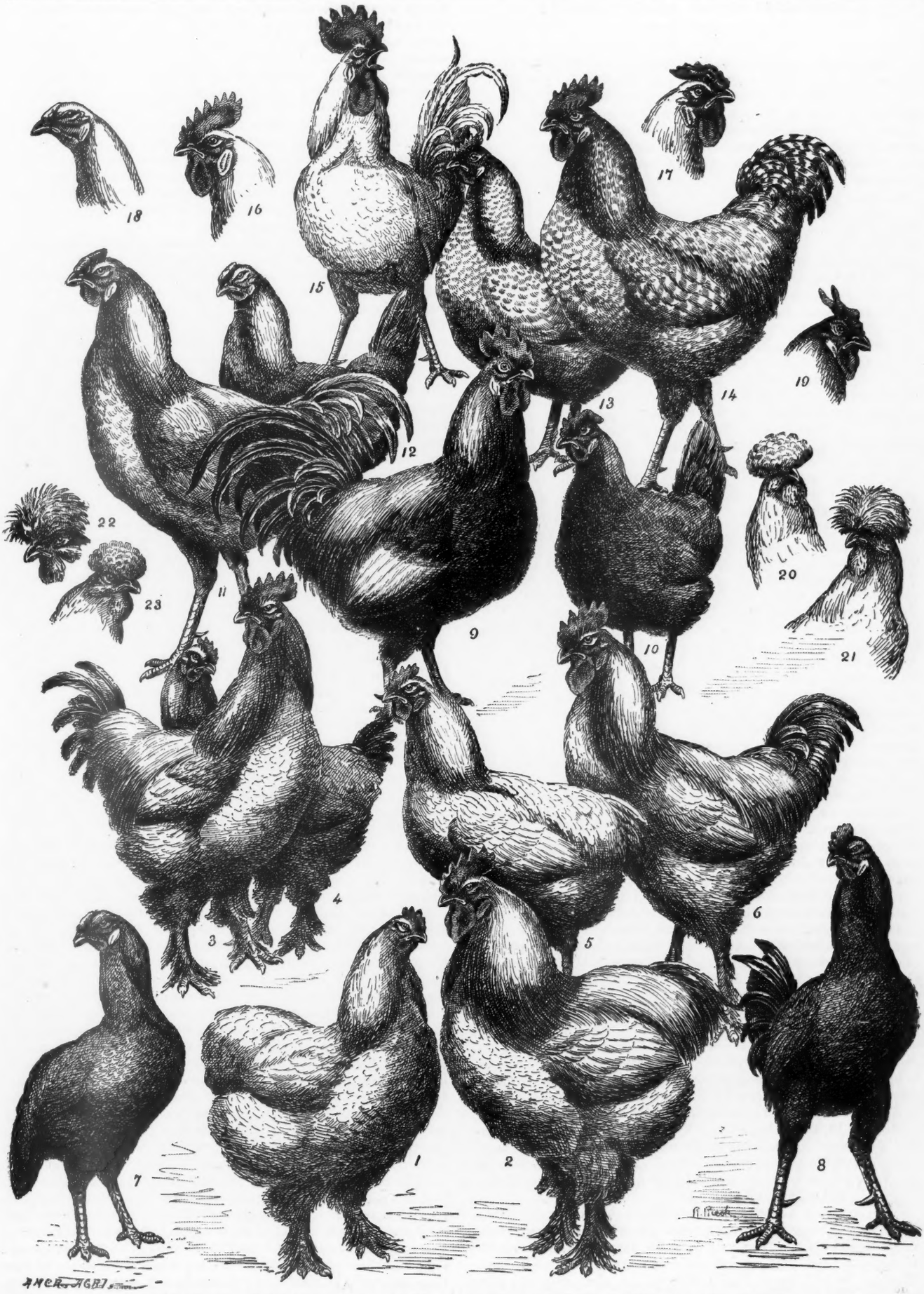
The Russian pears have also needed sifting, but even in Russia the pear does not succeed on all soils. Some of them, of fairly good quality, do well on wholly unprotected prairie ridges in North Iowa, but they all fail on low, black soil in protected positions. The Russian cherries, plums, and prunes, are making their way without much opposition. Even on our most favored soils, the West European stone fruits were not satisfactory, and on the great prairies they were a total failure. Some of the newcomers will prove of great value over a very large part of the Northern and even Southern States, as the cherries are better in quality than the Richmond or Montmorency, and carry better foliage, and some of the plums and prunes are less subject to rot, or the attacks of the curculio, than the common varieties.

THE WORK OF CROSSING.

The introduction of a hardier race of fruits on the college grounds at Ames gives a fine opportunity for systematic crossing. During the past five years, we have used the pollen of the best known orchard fruits on blossoms of the hardiest known varieties. This kind of crossing is new to our country, except with the grape and some of the small fruits and flowers, and it has much interest and prospective value. The present outlook is that our seedlings will follow the prepotent mother stocks in hardiness and inherent vitality, and that the fruits will be largely modefied by the pollen used. Some of our trials of the seedlings at the far North, and the few first fruits tested, favor our present belief. As an instance the De Soto plum, fertilized by pollen of the Peach plum of Oregon, has given us a tree which appears to be as perfect as the De Soto, while the fruit has the suture, color, and an approach to the size of the Peach plum.

If it proves true that a single variety out of fifty follows the prepotent mother in hardiness, and follows the male element in fruit, we will reach great results, even including the growing of sweet almonds in Iowa, as the Siberian almond is perfect with us, and its fruits only need an increase in size and flavor. The one thing needful on these garden-like prairies has been a list of the orchard fruits on which we could rely. That it will be attained in the very near future is now as certain as the fact that Dame Nature distributed her best gifts lavishly west of the great lakes.

Aquatic Gardens.—Water lily gardens, as now managed, are of purely modern origin. Aquatics are easy to grow and have become exceedingly popular. Within the past ten years, we have added immensely to the variety of these plants. Prior to some fourteen years ago it was much doubted if there was a yellow nymphæa in the world, but now we have several kinds of them in common cultivation. And many other choice aquatics are of recent production or discovery.



POPULAR BREEDS OF FOWLS, OLD AND MODERN. (*See Page* 32).

DEVELOPMENT OF OUR POULTRY INDUSTRY.

H. S. BABCOCK.

The history of thoroughbred poultry in the United States is almost wholly included within the past fifty years. Fowls there were prior to that time, but they were a motley crowd, with little attempt at breeding for specific points. As early as 1835 the Leghorn was introduced into the country, but this fowl was soon bred promiscuously with the common stock, and its special characteristics were lost. It was not until the introduction of the Asiatic fowls, the Cochins, and the Brahmas, that anything like careful breeding of poultry was begun.

About 1845 the Cochins appeared, and their great size and strange appearance awakened a special interest in poultry-raising. In 1847 came the Brahmas, and in 1852 and 1853 the Brown Leghorns, then called Red Leghorns, from the color of the male bird. The introduction of the Asiatic fowls was the cause of that strange psychical phenomenon, known as the "hen fever," which George P. Burnham admirably ridiculed in his "History of the Hen Fever," greatly, it is said, to his pecuniary advantage. The book sold as rapidly as the fowls had previously sold, and Mr. Burnham made two fortunes, one out of the fowls and one out of the book. But this craze passed, and there was a period of comparatively little interest in poultry. The craze, however, had left some permanent benefits, for the Asiatic blood was good strong blood, and by its introduction the common stock of the country had been greatly increased in weight and in profitable character. Those early Asiatics were not the finished productions of to-day, but were longer in limb and gaunter in build than the modern fowls of the same class. They were prized especially for their size, and it was the boast of many a breeder that he had a rooster that could eat corn off from the top of a flour barrel. They were also really good layers of eggs remarkable in size. One enthusiastic writer of that time reported that they usually laid two eggs daily, and sometimes three, and, strange as it may seem to us, this report was believed by not a few. But carefully-kept records proved them to be prolific layers, surpassing many of the other then-known breeds.

The introduction of the Leghorns reawoke the slumbering enthusiam for poultry, and their remarkable egg records seemed to be a perfect justification for this reawakening. Mr. Charles R. Harker wrote a little book on the Leghorn; Mr. H. H. Stoddard did the same; and Mr. F. H. Ayers made a journey to Italy for the express purpose of importing Leghorns, and, on his return to this country, published, under the title "The Quest of the Leghorn," a graphic account of his journey and of the fowls he saw abroad. In 1872 specimens of the Brown Leghorn were sent to England, and won immediate favor, Mr. Lewis Wright paying them a handsome tribute in his illustrated work on poultry. In 1858 occurred the "Lord importation" of White Leghorns, if these fowls were really White Leghorns. It is said they had white legs, and it is possible they were Minorcas, and not Leghorns. But in 1863 the "Stetson" birds arrived, and these had yellow legs and white plumage, and were, unquestionably, White Leghorns.

From 1861 until 1865, owing to the Civil War, the interest in poultry declined, but, when the war was over, the breeding of thoroughbred fowls was taken up with renewed vigor, and it has known no diminution of interest since then. About 1879 appeared the Plymouth Rock, a fowl of cross-bred origin, which took a name already made for it by Dr. Bennett's extinct Plymouth Rock, produced, as he stated, by crossing a Cochin China cock and a hen which was a cross of fawn-colored Dorking, Malay, and wild India fowl. The modern Plymouth Rock was of very different origin, having been produced by a cross of the Dominique and the Java. Not long after this appeared the Wyandotte, which was, unquestionably, the result of complicated crosses, and which was formally recognized as a distinct breed by the American Poultry Association, in 1883, although it had asked for admission six years prior to that time. The Plymouth Rock has been differentiated into four varieties, the Barred single-combed, Barred pea-combed, White single-combed, and White pea-combed. The Wyandotte has also diverged into varieties, there being now the Silver, the Golden, the White, the Black, and a Buff well under way.

The last ten years of poultry-breeding in this country have been characterized especially by the production and introduction of new varieties and breeds. Not only have the Plymouth Rock and the Wyandotte been split up into numerous varieties, but Redcaps, Minorcas, Indian Games, Buff Leghorns, and other varieties, have been imported from foreign countries, and there are now numerous breeds, or varieties, partially made which, in the course of a year or two, will be introduced to public notice. And what is true of the larger fowls is also true of the Bantams, numerous new varieties having been made or imported. Fifty years ago there were very few distinct breeds of fowls in this country; to-day there are not less than one hundred. Fifty years ago there were no fixed standards for breeds, always excepting the Hamburg fowl; to-day there are carefully-prepared standards for the numerous breeds and varieties. Fifty years ago the fowls were bred promiscuously, and their specific characteristics were very uncertain; to-day they are bred with intelligent care, and their characteristics, even to the shade and marking of a feather, are definitely fixed. Fifty years ago there were practically no breeders of thoroughbred fowls in this country; to-day their name is legion.

This great change has not come by chance, but can be traced to definite causes. The "hen-fever" has already been alluded to as one cause. This, by calling attention to the fact that fowls were profitable, and that in them was a hitherto neglected source of income, was, perhaps, the chief cause, but it was supplemented by others. The poultry exhibition, by collecting the various kinds of fowls together, afforded the public an opportunity to study their characteristics, and stimulated the desire to possess either the most beautiful, or the most profitable varieties. The poultry press (both those publications devoted exclusively to poultry, and those which had a department in which poultry matters were discussed) fostered the nascent industry. The American Poultry Association, an organization of the leading poultry breeders of the country, encouraged, and, through its standard, directed the growth of this industry. And the application of artificial methods to the hatching and rearing of poultry made possible a distinct branch of the business, and widened its scope. Without the incubator and brooder, the broiler business could not have existed, for this business requires chickens when broody hens are not to be had in sufficient numbers. All these causes have united to make poultry one of the great industries of the country, a source of national wealth, a partial means of income to thousands, and the total support of not a few. And all of this has been accomplished within the period of fifty years.

[In the large illustration on the preceding page Figs. 1 and 2 represent the modern Buff Cochin, Figs. 3 and 4 the old Cochin China, Figs. 5 and 6 the old Shanghæ, Figs. 7 and 8 the modern Indian Game, Figs. 9 and 10 the Dorking, Figs. 11 and 12 the old Malay, Figs. 13 and 14 the modern Plymouth Rock, Fig. 15 the old White Leghorn, Fig. 16 the modern White Leghorn, Fig. 17 the modern Rose-Comb Leghorn, Fig. 18 the modern Game, Fig. 19 the modern La Fleche, Figs. 20 and 21 the modern Laced Polish, and Figs. 22 and 23 the Houdan.]

FEEDING POULTRY IN WINTER.

E. P. CLOUD, PENNSYLVANIA.

In the morning give the fowls a warm breakfast, prepared the evening previous by cutting up a bucketful of clover hay in half-inch lengths, using a cutter made for the purpose. To this cut hay add one quart of cornmeal and two quarts of bran; scald with boiling water and let it stand over night, covered with a piece of old carpet or bagging. Before feeding it in the morning stir the whole mass thoroughly together, and while it is warm place it in the feed-troughs. At first they eat sparingly of it, but in a few days they will clean it all up nicely and very quickly. After this feed they will sing merrily and be very happy, and a little later their crooning song is changed to the staccato cackle which announces the much coveted eggs. At dinner time two quarts of wheat may be scattered among the litter, and the fowls will scramble in great confusion for it. They scratch and pick among the chaff, obtaining the exercise needed to prevent storing up fat, which is to be always avoided as an enemy to egg production. In the evening, before they go to their roosts, give them a feed of whole corn, which furnishes employment to their digestive machinery during the night, and supplies the needed heat while inactive. This promotes a comfortable night's rest which poultry need as well as man.

Twice a week change the morning feed. Omit the cut clover hay, and give them a warm mess composed of mashed boiled potatoes, turnips, beef scraps, and dissolved pork cracklings, some corn meal, and wheat bran, all thoroughly mixed and fed warm (not hot). This supplies the variety necessary to health. The beef scraps and pork cracklings supply animal food in place of the worms and bugs they get while at liberty. Occasionally give them corn and oats ground together in place of pure corn meal.

A MAMMOTH INCUBATOR.

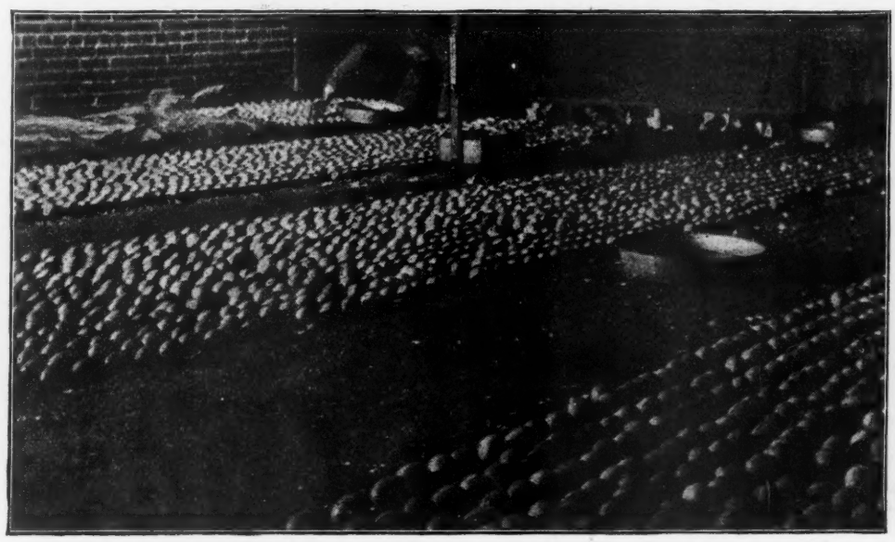
NINETTA EAMES, CALIFORNIA.

An ingenious hop grower of Ukiah, Cal., put his kiln to a novel use the past summer, while waiting for the usual fall curing of his crop. After lighting the great furnace underneath the wire drying floor, he carefully gauged the temperature with a thermometer, and then spread freshly-laid eggs upon the screen, thus changing the building into a gigantic incubator. At the first trial, 6,500 eggs were tirelessly watched during the incubating period. There was much excited interest evinced by the good townspeople when it came to the hatching out of the chicks. The capacious brick kiln was invaded by miscellaneous crowds of amused, curious visitors, and finally, at the solicitation of prominent inhabitants, a regular exhibition was made of the multiplied broods. On this occasion there were exposed at one time on the raised platform of the kiln, 2,500 downy, peeping mites of every conceivable shade possible in infantile chickens. Whether the experiment, successfully demonstrated in this instance, will be repeated by other hop-growers, remains to be seen. [The illustration herewith is engraved after a photograph furnished us by Mr. Carpenter, the local artist of Ukiah.]

PROGRESS IN ARTIFICIAL INCUBATION.

P. H. JACOBS, NEW JERSEY.

In my younger days, when I commenced to read the AMERICAN AGRICULTURIST as my authority, little did I suppose that such a thing as an incubator could be conceived of. I had heard of something of the kind as an ancient institution, but it was to me a fabled story that permitted of no acceptance as fact. Nearly half a century has passed, and to-day I witness as many, and as mysterious, changes in the domain of poultrydom as in all other departments of the farm. In former years the "old hen" was but a nondescript, with no royal road before her to fame. Hers was a despised place on the farm. Her duty was to be self-reliant, independent, self-sacrificing, and contented. If her owner did not live in a palace neither did she, and if his fare was frugal and plain hers was more so, and her struggle was to be one of the "survival of the fittest," and to exist in the face of adversity. To-day she is fed at the trough, is given shelter, and a machine relieves her of the anxiety of tenderly caring for her little ones.



A NOVEL INCUBATOR.

The incubator is not intended to take the place of the hen entirely, in the hatching of chicks. It is doubtful if inventive genius has yet succeeded in excelling the hen in her natural functions, but the incubator is now such a necessity, as an adjunct in supplying early broilers and roasters, that the market could not be supplied without its use. Only the incubator can be relied upon to hatch early broilers in winter. Hens seldom sit during the cold months, as they cannot raise their broods without aid at that season; but the incubator can be operated at any time, and to any capacity. The incubators hatch thousands of chicks and ducklings, and provide employment for many persons during the dull season. The great improvement in brooding has kept side by side with artificial incubation to a degree that avoids but little loss.

Prices also keep pace with the supply. Those who can look back with the AMERICAN AGRICULTURIST can well remember when four pence (six and a quarter cents) would buy a dozen eggs, and eight pence (twelve and a half cents) would buy a large chicken, and yet all the chicks were hatched by hens. But during the past year there has not been a month that chicks, not over three pounds weight each, sold for less than twenty cents a pound in the New York market, for choice, dressed stock, while as high as sixty cents per pound has been reached some years in April. All this, too, with hundreds of incubators in full operation, and thousands of chicks hatched daily; with the aid, also, of cold storage processes for holding back and regulating the supply by merchants.

There are broiler farms upon which six thousand chicks are brooded at the same time, and there are many broiler farms with capacities ranging from one thousand to three thousand chicks every three months, as well as numerous smaller establishments; and, as the business is concentrated on small spaces, the work is nearly all under shelter. We now raise chicks indoors where, in times gone by, they were exposed, and selected breeds are used for the production of broilers and eggs, in place of the diminutive and wind-beaten scrub.

Marvels do not cease. To-day the ducks are not necessarily kept near ponds or streams, and they are as large as the geese of former days. The incubator has done more for the duck market than in supplying chicks, as it is not uncommon to hatch and raise as many as ten thousand ducklings on some farms especially provided for that purpose. In place of the puddle duck we have the white-plumaged Pekin and Aylesbury, and the gaudy-colored Rouen, which are made to weigh over five pounds each, when ten weeks old. Ten years ago, only, "green ducks" were unknown, but now the market clamors for them, and the incubator supplies them. It would be no more difficult to harvest our great crops of wheat without harvesters and binders than to supply purchasers with "green ducks" and "spring chickens" without the aid of the incubator and brooder. As in other industries the cost diminishes as improvement progresses. Those who have listened to the ticking of the costly old clocks that stood in the corner, and which were real luxuries, appreciate the cheap clocks and watches of the present day. Likewise those who have struggled with all sorts of costly appliances in the past to "circumvent the old hen" fully appreciate the great strides made in simplifying the hatchers, which, at the present time, are comparatively as low in price as any other implement useful to the farmer. They are even cheaper than hens for hatching, as they perform their work by wholesale, and take the place of dozens of hens, leaving the hens free to provide the eggs. There is nothing invented, so far, that interferes with the usefulness of the hen. She still has a wide field before her as an egg producer, for the reports of the boards of trade show that many million dollars' worth of eggs are consumed and used in the arts, to say nothing of the enormous supplies of poultry of all kinds.

What the future may bring forth cannot be surmised, for changes may occur in the breeds, of which we have no conception. Within the past half century the breeds have been endowed with certain characteristics. The sitters are distinct from the non-sitters, and the table fowls have been separated from those that are especially adapted for laying. That the hen will be entirely deprived of her sitting instinct is assured already, but which path she is destined to pursue in other respects is a problem. She keeps pace with the times, however, and holds her position in competition with larger stock on the farm. Those of limited means will take advantage of her prolificacy, which places her beyond the reach of monopoly, but the future will also find her fulfilling but one duty—laying eggs. Artificial incubation will be practiced on all poultry farms, and yet, with the great progress already made, artificial methods may but only be in their infancy, and the future may be productive of greater developments than the past has been.

BEET SUGAR IN THE UNITED STATES.

DR. H. W. WILEY, CHEMIST DEPARTMENT AGRICULTURE.

The question of the production of beet sugar in the United States, is one which is now exciting widespread public attention. Since 1880, beet sugar has been successfully made in California, at Alvarado, and three large sugar factories are now in operation in that State. In 1890 a beet sugar factory was erected at Grand Island, Nebraska, and last year another one at Norfolk, Nebraska, and a large one at Lehi, near Salt Lake City, in Utah. From estimates, on file in the office of the Commissioner of Internal Revenue of the United States, and from reports, which have already been received, it is probable that each of these factories will make about 3,000,000 pounds of sugar during the present season.

Extensive experiments have been carried on by the United States Department of Agriculture, for the purpose of fixing the localities in the United States where the soil and climate are best suited to beet sugar production. A special experimental station has been established at Schuyler, Nebraska, where, during the past season, five varieties of sugar beets were grown, from imported seeds, which yielded an average of over twenty tons of beets per acre, with a content of sugar of about 13.5 per cent. Several thousand analyses have been made during the present season by the Department of Agriculture, of beets grown in various parts of the United States, and in the great majority of samples of beets, which have been sent for analysis, it is found that the content of sugar has been over twelve per cent. There seems to be no doubt of the fact that there is a vast area in the United States where sugar beets, of exceptional richness, can be grown. This area is confined chiefly to the northern part of our country and to the elevated plateaux of Utah and Colorado, the coast valleys of California and to the States of Oregon and Washington. It cannot be denied, however, that beets of exceptional richness have been grown further south and especially in the Shenandoah Valley, from which locality, during the present season, many samples of beets of high saccharine strength have been received.

The question of success of the beet sugar industry in the United States is, therefore, no longer a climatic one nor one of soil fertility. It is simply a question of the willingness of our agricultural population to engage in this kind of work. The growing of sugar beets is not agriculture, it is horticulture, and it is found that the farmers of the United States are very loath to change from their agricultural habits to horticultural pursuits. The amount of labor involved in the growth of an acre of sugar beets is appalling to the farmer who is in the habit of cultivating forty or fifty acres of Indian corn with a single team. When such a man is reminded of the necessity of spending thirty, forty, and even fifty dollars on a single acre, he is very apt to turn from such a prospect with distrust. Yet it remains true, that if sugar beet culture is to succeed, we must adopt, at least for the present, the methods in use in Europe for the growth of this plant. Small areas only, must be planted by each farmer, and the land must be especially prepared for the purpose. The sugar beet requires a loose permeable subsoil and also a subsoil of considerable fertility, inasmuch as the mineral constituents of the beet are drawn chiefly from the subsoil. It is this peculiarity of the plant which has rendered the problem of fertilizing the soil so difficult; and one of the chief questions which now agitates the German and French farmers is to devise a means by which potash fertilization, especially, can be incorporated in the subsoil. Deep plowing, subsoiling, and thorough preparation of the seed bed are absolutely essential to successful sugar beet culture.

It will simply be a question of profit. If a farmer can make more money growing Indian corn, wheat, hogs, and cattle, he will continue to do so; if experience should show, however, that in certain localities he can make more by the growth of sugar beets he will not be slow to change his methods of farming, and enter that field of industry. The capital necessary for building factories is abundant. There are, perhaps, now in this country several millions of dollars awaiting investment in beet sugar factories, just as soon as the investors can be assured of the coöperation of the farmers. A beet sugar factory of fair average size, capable of working three hundred tons of beet roots per day, should have tributary to it about six or eight thousand acres of first-class farming land. It will require from two to three thousand acres of beets each year to supply the factory with a sufficient quantity to keep it running the three or four months necessary for manufacture. With the proper rotation of crops which prevents beets from being grown on the same field more than once in three or four years, it is easy to see that from six to eight thousand acres of suitable land must be available. The beet sugar factories, therefore, must be located with reference to the land which is tributary to them. They should be, as nearly as possible, in the center of the region where the beets are grown. No farmer should be compelled to draw his beets more than two or three miles at most. It is thus seen that practically all of the land immediately surrounding a factory must be available for the cultivation of beets. The location of the factory must also be governed largely by the cost of fuel and its proximity, and by the abundance of water. For these reasons, beet sugar factories cannot become very numerous. In fact, it would require only about five hundred first-class factories, worked up to their full capacity, to make from beets all the sugar which is now consumed in this country. But it will be a long while before we see even one hundred factories in operation, by reason of the difficulty of educating the farmers up to the point of furnishing the raw material.

The benefit which a beet sugar factory confers upon a community, is not confined alone to the sugar which it makes. A beet sugar factory is a veritable experimental station. By compelling farmers to adopt scientific methods of culture for beets it induces them to adopt scientific culture for every other crop. When we study the agricultural conditions of Europe, in localities where beet sugar factories have been established, we are struck with the vast improvement manifested in all kinds of agriculture. A beet sugar factory located in any community will, in a few years, be felt in every wheat field, and maize field, and meadow in the whole community. It will increase the value of every agricultural industry, and not only benefit a community by establishing in its center a vast manufacturing interest, but also in all the various ways indicated above. Those portions of our country, therefore, in which the soil and climate are suitable for sugar beet culture should not be slow to encourage the erection of factories.

FUNGUS DISEASES AND THEIR REMEDIES.

DR. B. D. HALSTED.

Early in the century, among students of fungi, the names of Rafinesque and Schweinitz appeared, followed, in the fifties, by Ravenel, Berkely, and Curtis. Coming down to the seventies, we find, somewhat in the order of their publications upon mycology, the names of Peck, Burrill, Farlow, Ellis, and Bessey, chief among several others, who began to shape the study of economic fungi as we find it to-day.

There is no better way of showing the present status of our subject than to briefly state what the Department of Agriculture and Stations are doing. In the first place is the Division of Vegetable Pathology of the Department of Agriculture, the central point of economic mycology in this country, where many lines of investigation are pursued, and tests of various remedies are made.

Let us note some of the practical points gained by the study of fungi. In the logical sequence of discovery it was first necessary to establish that any given trouble was of fungus origin. The next step was to find some method of checking it. The principle involved consists in the application to the susceptible plant of a fine spray containing some substance that, when in contact with the spores, will either kill them, or prevent their development. The whole practice of using fungicides depends upon the fact that those mildews, rusts, blights, and the fungus decays produce minute spores, which are easily disseminated, and thereby propagate the trouble far and wide. Those spores, either as such or when undergoing germination, are easily injured by various chemicals, notably the compounds of copper. It, therefore, follows that if these fungicides be placed upon the foliage, in a thin film, they will go far toward destroying the spores already there, and prevent those subsequently falling upon the foliage from germinating. The ways in which this principle is carried out are many, depending upon the nature of the infested plant. For example, to prevent smut in grains it is found best to soak the seed, before sowing, in some solution that will kill the adhering spores, while doing no injury to the grain itself. Beginning with a long soaking of the seed in a weak solution of bluestone, the time was shortened and the solution made stronger. The latest method is to soak the grain in water heated to 125° to 130° for a few minutes, no chemicals being used. This simple method, if employed, will save millions of dollars to our farmers, annually, in added wheat, barley, oats, corn, etc. In the vineyard, the method of treatment is necessarily different, for the subjects are not annual plants, but vines, living indefinitely. There are many serious fungus enemies to the grape, and the vineyard has been a prominent place for testing fungicides, and, to-day,

formulæ can be given which, if followed out to the letter, will save, practically, the whole crop from black rot. In the leaf blight of the pear, orchardists have long had a serious enemy. Remedies for the fungus causing this premature falling of the foliage, and the blotching and cracking of the fruit, have been found, so that there need be no further fear from this enemy. In this case, as with many others, insect enemies are to be fought also, and this can be done by mixing an arsenate with the fungicide, and applying the two at once, through the same nozzle. It is fortunate that this combination is possible, for it not only insures a better crop where sprayed, but increases the chances of spraying being done, since some fruit-growers will apply the remedies, when together, who would not if they must be sprayed separately. What has been said for pear leaf blight applies with equal force for apple scab, which, unchecked, almost ruins the crop in many sections, but, by spraying is prevented, in great measure. In like manner the strawberry blight and anthracnose of the blackberry and raspberry are being studied, and remedies bid fair to be forthcoming. It also seems to be only a question of forethought and some labor whether the plums and cherries shall be cured of the fruit rot.

In the vegetable garden and ornamental grounds, the diseases have not been so largely studied, but it has been demonstrated that many blights, as those of the bean, celery, egg-plant, melons, potatoes, tomatoes, etc., can be, in a large degree, controlled. Flowers and ornamental plants are not exempt from blight, for the rose, violet, hollyhock, carnation, and a host of others, are attacked. Many vegetable pathologists are applying remedies for these, and gardeners are beginning to feel that they, as well as the orchardists, need to be equipped for fungus enemies.

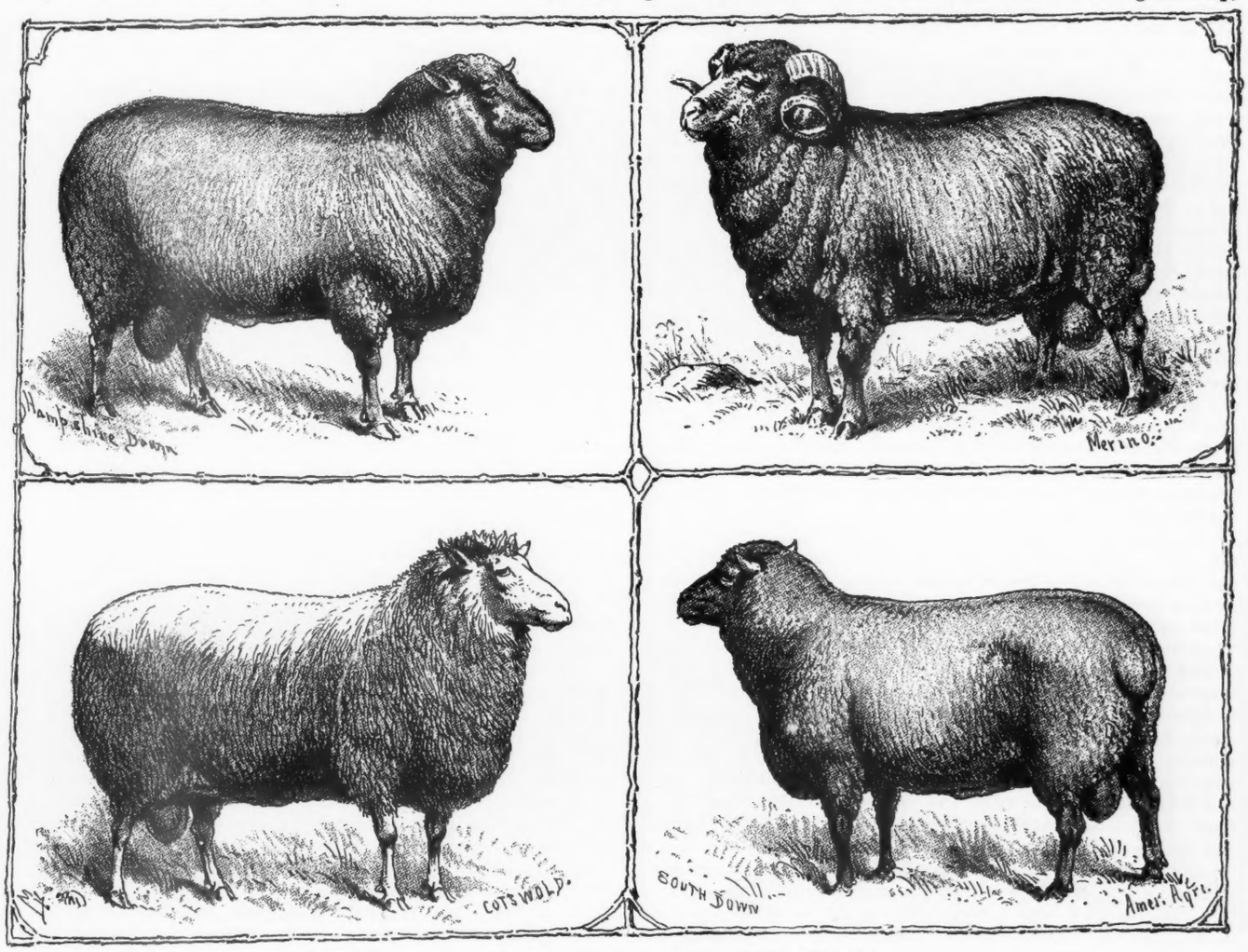
Along with the study of fungi, and a desire to apply remedies to them, there has been a constantly growing demand for spraying apparatus. The growth toward perfection of this branch of the subject has been phenomenal, for, within the past year or two, the numbers of patterns of pumps, nozzles, etc., has been only equaled by the ingenuity of the Yankee mind, and the end is not yet. Cheaper and more convenient sprayers will come, and the day is not far distant when fungicides, and means of applying them, will be as much a part of the equipment of a first-class farm—particularly one devoted to fruit or truck—as is the cultivator or market wagon.

This state of things is largely due to the work done by the Department of Agriculture during the past six years, intensified and more widely spread by the several experiment stations throughout the country.

IMPROVEMENT OF SHEEP.

JOSEPH HARRIS.

In America, especially, great improvements have been made in Merino sheep, both for wool and mutton. Liberal feeding, protection from the weather, and the most skillful selection have accomplished wonderful results. In the mutton breeds of English sheep, most remarkable improvements were made previous to the present half century, and breeders, during the last fifty years, have not only held what was gained, but have steadily pressed forward the good work. It may be said that we had as good Leicester, Cotswold, South Down and Hampshire Down sheep fifty years ago as we have to-day. This may possibly be true, though I do not think so. At any rate, we are paying more attention to purity of blood. Even if individual sheep are no better in size, form, lightness of offal, early maturity, quality of meat, and fattening qualities, they have greater prepotency, and are capable of impressing these qualities more strongly on their offspring. This is an immense gain. In addition to this, where we had one good breeding flock fifty years ago, there are now a score, or a hundred. The improved breeds of sheep have been sent into every civilized country in the world, and probably at no previous time has there been so great a demand for good breeds of sheep. The most important special improvements in the English breeds of mutton sheep that have been made in the last fifty years, may be named as: First,



SHEEP FOR MUTTON AND FOR WOOL.

an increase of weight at an early age; second, less offal; third, an increased development of the choice parts of the carcass; fourth, less tallow and more juicy, fat, nutritious, tender meat; fifth, finer wool; sixth, a stronger constitution and greater vigor.

It may be asked, "Which is the best breed of sheep?" In the experiments made by Lawes and Gilbert many years ago, the Cotswolds ate the most, gained the most, and produced the most wool. They also gained the most in proportion to the food consumed. But when the sheep were sent to the London market and sold by one of the most experienced salesmen, the Cotswold mutton brought the lowest price per pound, and the South Downs the highest, so that when a balance sheet was struck, it was not easy to say which was the most profitable breed! The Hampshire Down sheep, next to the Cotswold, gained the most rapidly in the experiments referred to. If the Shropshires had been tried, they would, undoubtedly, have done equally well, or better. The Sussex, or true South Down, were at that time a small breed, but the mutton commanded the highest price in the London market. The late Jonas Webb and other breeders, aimed to retain the high quality of the mutton, and at the same time increase their size. They accomplished their object. It was the desire for larger sheep of the Down family that brought the Hampshire Down, Oxford Down and Shropshire Down breeders to the front. Farmers wanted the rapidity of growth of the Cotswold on the farm, and the price of the Down in market—or, if they could not secure it, they wanted to get as near to it as possible. They have met with remarkable success, exceeding even their fondest expectations.

In this country we have all the prominent English and Scotch breeds, and Merinoes in addition. The English sheep are bred for mutton, the Merinoes for wool. Probably four-fifths of all the sheep in the United States, the so called "common sheep," have a large proportion of Merino blood in them. They have some excellent qualities. They are hardy, healthy, slow maturing, long-lived sheep that will stand neglect and short rations, if need be, but will thrive well on more liberal treatment. In Western New York there is no money in raising them, but many of our farmers find it profitable to buy them in the fall and fatten them in winter, selling them in the spring at an advanced price per pound. The money is made not so much from the increased weight as from the increased quality caused by better feeding.

The increase of wealth in the cities has created a great demand for good mutton, and especially for good lamb. Forty-one years ago, several of my neighbors bought sheep, and after selling the pelts and sometimes the legs, rendered down the carcass for tallow. I recollect buying a very fair leg of mutton for twelve and one-half cents. I do not think that there has been any improvement in this kind of common sheep. They are no larger or fatter than they were then, but the introduction of rams of the English breeds of mutton sheep has entirely changed the character of nearly all our flocks of sheep. We keep sheep for lambs and mutton, and not primarily for wool. Great as has been the improvement, it would have been still greater if pure-bred rams had been used and the sheep had received more care and better feed. We talk too much about breeds. Some one goes to England and finds a breed that is named after the county in which the breeder is living; he brings it over here and then goes to work to "boom" it. What we want to do is to improve our common sheep.

Much has been done in this direction, but more remains to be done. It is folly to talk about "feeding for fat, and feeding for lean;" what we want to do is to feed. We starve our sheep, and consumers complain of the character of our mutton, and most justly so. As good mutton is sold in our markets as can be found in the world, but there is a great deal of poor mutton palmed off on those who do not know good meat from bad. Our people need educating in this matter. They go to Europe, and on their return they ask why they cannot get as good mutton chops here as they got in England. They can get better. When people stop buying poor mutton, our farmers will pay more attention to raising and feeding good sheep. We have everything ready to our hands. Our common sheep are acclimated, healthy, hardy and vigorous, with good appetites and digestion. We have imported, for many years, the best sheep of the leading English breeds that money would buy, and we have kept them pure. Our breeders sell at lower prices than are obtained for similar pure bred sheep in England. Our farmers can best afford to buy pure bred rams to cross with our common sheep. This is the first great step; good care and liberal feeding will do the rest.

We can find use for all good breeds. An infusion of Dorset blood will do our common sheep good. The Dorsets have horns, which I suppose indicates vigor of constitution. They are of good size and good shape, and easily fattened, and produce early lambs and a good many of them. We have many "abandoned farms," and millions of acres of poor, sandy land on the Atlantic slope where sheep could be kept with advantage, and the next fifty years will witness wonderful improvements on such land from keeping sheep.

[Illustrations of typical Hampshire Down, Merino, Cotswold and South Down sheep are given in our engraving on the preceding page.]

OUR NURSERY INDUSTRY.

GEO. ELLWANGER.

There is no industrial calling that has added so much to the pleasure, comfort and happiness of mankind as the producing and disseminating of fruit and ornamental trees. What were our homes without the nurseryman—the fruit gardens he has been the means of contributing, the orchards whose trees he has reared, the shade and ornamental trees and shrubs in their infinite varieties which have been cultivated and improved through his labors? Back of the orchard, the vineyard, the park and the home-grounds, stands the nursery, the vital factor and prime mover in their production! We should therefore honor and hold in grateful remembrance the names of those who have laid the foundation of this important, far-reaching, and delightful industry.

Among the pioneer nurserymen of this country I take pleasure in naming: William R. Prince, of *Morus multicaulis* fame; James Bloodgood, of Flushing; William Kendrick, of Newton; C. M. Hovey and Samuel Walker, of Boston; A. J. & Charles Downing, of Newburgh; Thomas Hancock, of Burlington; William Reid, whose early nursery was at Murray Hill, the ground of which is now covered with palatial residences; James Wilson of Albany, who has given to the country the famous strawberry bearing his name, and who was the introducer of Rea's Mammoth quince; and finally, although not a nurseryman, a great amateur and disperser of fine fruits, the Father of American Pomology, Marshall P. Wilder. These worthy men established the foundation of American horticulture and pomology. Monuments adorn our parks and squares in grateful memory of soldiers, statesmen, poets, and men of letters. I trust all lovers of the garden and orchard will join in the erection of a monument in lasting love and commemoration of these equally great public benefactors. I will propose a bronze figure of "The Father of American Pomology" with his favorite Anjou pear in his hand, and the above names emblazoned on a granite pedestal.

In this connection we must not forget the great services that Downing, Hovey, Barry, Thomas, Dr. Thurber, Meehan, Dr. Warder, Elliott, Batcham, and Lyon have rendered to American horticulture in general, but more especially to pomology—through the press, in books, and in addresses. The catalogue of the American Pomological Society was, with much labor, placed in its present form by Mr. P. Barry. Mr. A. J. Downing, the projector of Central Park, has given us a most valuable and delightful work on landscape gardening and pomology, the latter having been revised by his brother, Charles Downing. I should likewise include the Horticulturist, Hovey's Magazine, Gardner's Monthly, American Agriculturist, Country Gentleman, and Moore's Rural New-Yorker as having rendered eminent service in the cause of horticulture and pomology. The Massachusetts Horticultural Society has also been largely instrumental in promoting the cause of horticulture.

We now come to the time when the West was opened to immigrants, about 1840, the greatest immigration taking place a few years later during the settling of Ohio, Michigan, and Illinois. The nursery business was already under fair headway at this latter period, when every man, leaving his eastern home, provided himself with a collection of fruit trees according to his means, for the purpose of planting them in his new home. At that time a few varieties of apples were grown in Western New York, by a few farmers, the trunks of the trees being trimmed to a height of nine to ten feet in order to allow a load of hay to pass under the branches. The Mount Hope Nurseries were the first to introduce low-branched trees, and also dwarf trees. The nurseries, then being comparatively limited, there was a scarcity of fruit trees throughout the country, and great incentives offered themselves to those establishing nurseries on a large scale. Of these, the more important at the period under consideration were those of Parsons of Flushing; Thorp & Smith of Syracuse; Ellwanger & Barry of

Rochester; J. J. Thomas of Macedon, N. Y.; B. Hodges, of Buffalo; Asa Rowe of Greece. Only three of these are now in existence, those of Flushing, Syracuse, and Rochester. During this period there were no steamers between New York and Europe, and all importations had necessarily to come by sailing vessels. Fruit stocks were not then grown in Europe for foreign demand. In 1844 I spent the winter in Europe to purchase fruit stocks, ornamental trees, etc., traveling through France and Germany to find what was wanted. There being no railroads then, I was obliged to transport a quantity of stocks on top of the "diligence" the entire distance from Strasburg to Havre. I mention this to show what difficulties the nurseryman had then to contend with, as compared with the present day, when everything is offered to be delivered at one's door. For a few years the California demand for young fruit trees was very large, and all transportations had to go over the Isthmus, requiring skillful packing. There was also a large demand from Australia and Japan, most of which was supplied by one of the largest nurseries.

The establishment of other extensives nurseries soon followed, the Smiths, and Maxwells of Geneva; Bissell and Hooker, Frost & Co., and Moulson of Rochester; Meehan of Germantown; Phœnix of Wisconsin; Stores of Painesville; Leslie & Co. of Toronto; Hoopes, Brother & Thomas of West Chester; Berckmans of Augusta; Strong of Newton, etc., etc. The list of varieties cultivated by the leading nurseries, has been very much reduced of late, only those of superior quality being now cultivated and offered for sale, by most establishments. A large portion of the varieties of pears, apples, plums, and peaches that were catalogued forty years ago, are still among the best varieties to-day. A great deal has been said regarding the Russian varieties of apples, though we possessed the best and most reliable fifty years ago, such as Red Astrachan, Duchess of Oldenburg, Alexander and Tetofsky.

Nurseries are now very numerous, being scattered all over the country. Most of the stock is disposed of through traveling agents

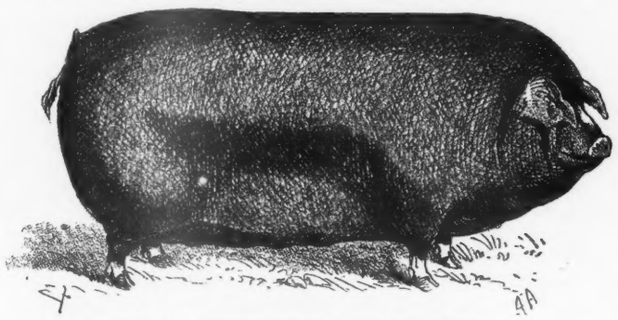


FIG. 1. THOROUGHBRED POLAND-CHINA.

and dealers. When the business is conducted by honest men, the middleman can do much good, distributing trees throughout the land, and often in places where no trees would be ordered from the nurseries. Yet, notwithstanding the numerous nurseries, there is always a scarcity of some leading varieties. For the production of fine fruits, there is no better soil and climate in the world, and very few regions are as good as the Middle States, the clear atmosphere and favorable soil imparting superior color and flavor. Perhaps we have made more advance in native grapes than in any other fruits, though the well-known Catawba still stands at the head of the list for excellence of flavor and keeping qualities, while the Concord is more extensively cultivated than any other variety.

In order to comprehend the importance of the nursery trade among the great industries, I quote from the report of the Census Bureau these interesting figures: There are in the United States 4510 nurseries, the value of which is estimated at $41,978,835, and occupying 172,806 acres of land with an invested capital of $52,425,669, and giving employment to 45,657 men, 2,279 women, and 14,200 animals. Truly this is a wonderful showing, as the result of the labors of about a half a century; and yet the nursery trade in the United States is still constantly growing and spreading in every direction, the demand for both fruit and ornamental trees and shrubs having practically no limit.

Potatoes and Manures.—In a series of recent experiments the best results came from the combined use of commercial fertilizers and barnyard manures. Kainit was less effective than the muriate or sulphate of potash and nitrate of soda was not found valuable for potatoes. Potash influences the composition of the potato and the sulphate the most favorably.

FIFTY YEARS OF SWINE-BREEDING.

F. D. COBURN, KANSAS.

Among the names by which farmers fifty years ago designated the families or breeds of hogs common in various parts of the country were, Suffolk, Leicester, Berkshire, China, Mackay, Grassfed, Newbury White, No Bone, Grass, Chester White, Woburn, Chinese Guinea, Surrey, Bedford, Corbet, Hindoo, Long-nosed Pike, Thin Rind, Calcutta, Byfield, Russia, Poland, Lincoln, Bakewell, Spanish

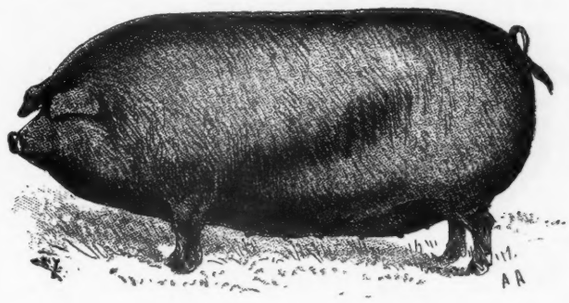


FIG. 2. THOROUGHBRED DUROC-JERSEY.

Black, Sussex, Essex, Norfolk, Parkinson, Medley, Yorkshire, and Razor-backed Alligator. Now, the breeds that furnish nine-tenths of the hogs slaughtered at the great packing centers are but two—the Poland-China and the Berkshire, both chiefly black, with white marklings on face and feet, The former is an American-made breed, begun by the farmers in Warren and Butler counties, Ohio, sixty or more years ago, by combinations of the stock then known as Russia, Byfield, Big China, Bedford, and Irish Grazier, resulting in a large, spotted stock of much local repute, with the name of Warren County hog. These were, later, liberally crossed with Berkshire blood and, from such foundations, by careful selection and mating, has come a breed that is now more widely popular and extensively reared in this country than any other. In November, 1872, a national meeting of swine breeders, held at Indianapolis, Ind., from a dozen different names by which these swine had been known, chose that of Poland-China.

The Berkshire is an English breed, first imported to America about 1830. During the ten years ensuing, the demand for them amounted to a craze. The methods and conditions, then prevailing among American farmers, appear to have in some way been unfavorable to the imported breed's prosperity and, after a few years, its popularity waned. For a quarter of a century, following, Berkshires were not wanted here, although in England their breeding and improvement was kept up. About 1865, the old prejudice against them had largely died out, and breeders in the United States and Canada began the importation of some of the best specimens British skill and experience had produced. Importations continued, they became widely disseminated, improvement

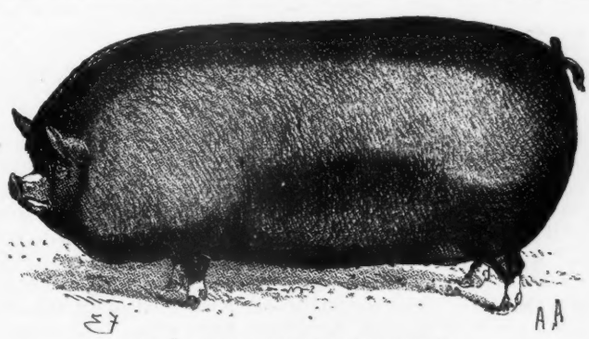


FIG. 3. THOROUGHBRED BERKSHIRE.

was constantly made, and now their stock, either pure, or as a cross, is popular, and largely used in every State. Single specimens for breeding purposes have sold for higher prices than those of any other breed. Their judicious crossing with the somewhat coarser Poland-Chinas, which has been much resorted to, is regarded by many excellent judges as producing animals superior, for general breeding and pork making, to these or any others purely bred.

White hogs in any considerable numbers have well-nigh ceased to be reared in the great central basin of the country. Next to Poland-Chinas, Berkshires and their crosses, the swine best known

are the Chester Whites. This breed had its origin in the use of stock brought from Bedfordshire, England, in 1818, upon the best of that at the time raised in Chester county, Pennsylvania. From 1860 to 1875 they were widely distributed from there in many States, and were more generally raised and crossed from, than any other improved breed. Hogs, other than white, were quite rare at that time, many people having a belief that the meat of a black hog was, in some way, less wholesome than that of a white one. Now, a day's journey in the great corn States, might not reveal a Chester White or a herd of any white hogs.

Other breeds that have been given more or less prominence in the last fifty years are Suffolks; large and small Yorkshires (white); Essex (wholly black) from England; Victorias of two entirely different foundations; and Cheshire, a white breed of American origin; Jersey Reds or Duroc-Jersey, a rusty red variety of large size and uncertain beginning, but quite a favorite with farmers in New Jersey. All these last mentioned have furnished individuals of undoubted excellence, and all have been in the direction of improvement, but, as a whole, their influence and impress upon the swine stock of America, while by no means to be despised or ignored, can be but vaguely discerned or defined.

No other people breed and raise swine to the extent that Americans do; none take greater pride in the quality and purity of their breeding stock, and none are at greater pains to preserve and publicly record its lineage. The public registry of swine pedigrees was first instituted by the American Berkshire Association in 1875, for that breed, and later it was taken up by associations of breeders of Poland-Chinas, Chester Whites, Essex, Duroc-Jerseys, Small Yorkshires, and Cheshires. In their numerous volumes are recorded the pedigrees of thousands of animals used, or being used, for the propagation and improvement of the respective breeds. English breeders adopted the methods of Americans, and have already issued several volumes of records for their Berkshire and other pure breeds.

In one especially important feature, it cannot be said there has been any remarkable improvement in fifty years. This is the almost exclusive use of growing Indian corn for fattening pork, though every man who ever examined the subject concedes that corn alone is not a complete or well-balanced ration for either growth or health. In earlier days when the country was new and much of it heavily timbered "mast" was an important factor in pork-making. It is doubtful if, even in these enlightened days, the abundant grasses and clovers are regarded with the same intelligent appreciation in the economy of pork production. The error of this violation of Nature's laws has been repeatedly demonstrated in the destruction, almost annually, of entire herds, on thousands of farms, by contagious maladies, called the convenient title of "cholera." The ability to wholly prevent losses by disease is perhaps not to be expected, but it is surely not unreasonable to believe that a more general use of green food, roots, other grains, clean water, and comfortable quarters, as adjuncts, with corn as the staple diet, will give to the American hog more robust health, to his flesh increased wholesomeness; to his market, a constantly widening horizon, and to his enterprising projector and producer, enhanced prosperity in purse and conscience.

APPLIED ENTOMOLOGY IN THE UNITED STATES.

DR. C. V. RILEY, U. S. ENTOMOLOGIST.

Economic, or applied entomology, has assumed in the United States an importance which has not characterized it in other civilized countries of the world, and the satisfactory nature of the results obtained with us is largely an outcome of our greater necessities and the consequent greater importance given to the subject as compared with other countries. Of European countries, France, more particularly, has undertaken similar work, and more recently the English colonies and dependencies, particularly Canada, Australia and New Zealand, have been quite active in this field. America has, from the beginning of our national existence, been recognized as in one sense insect burdened, not only because it is rich in native species which have learned to attack cultivated crops, but because many foreign insects have been unwittingly imported to add to the general injury. Even during colonial days, and particularly during the beginning of our independence, men prominent in public life were concerned as to the great losses sustained from insect injury, and Washington, Jefferson, Franklin and others, have left letters and essays upon the subject.

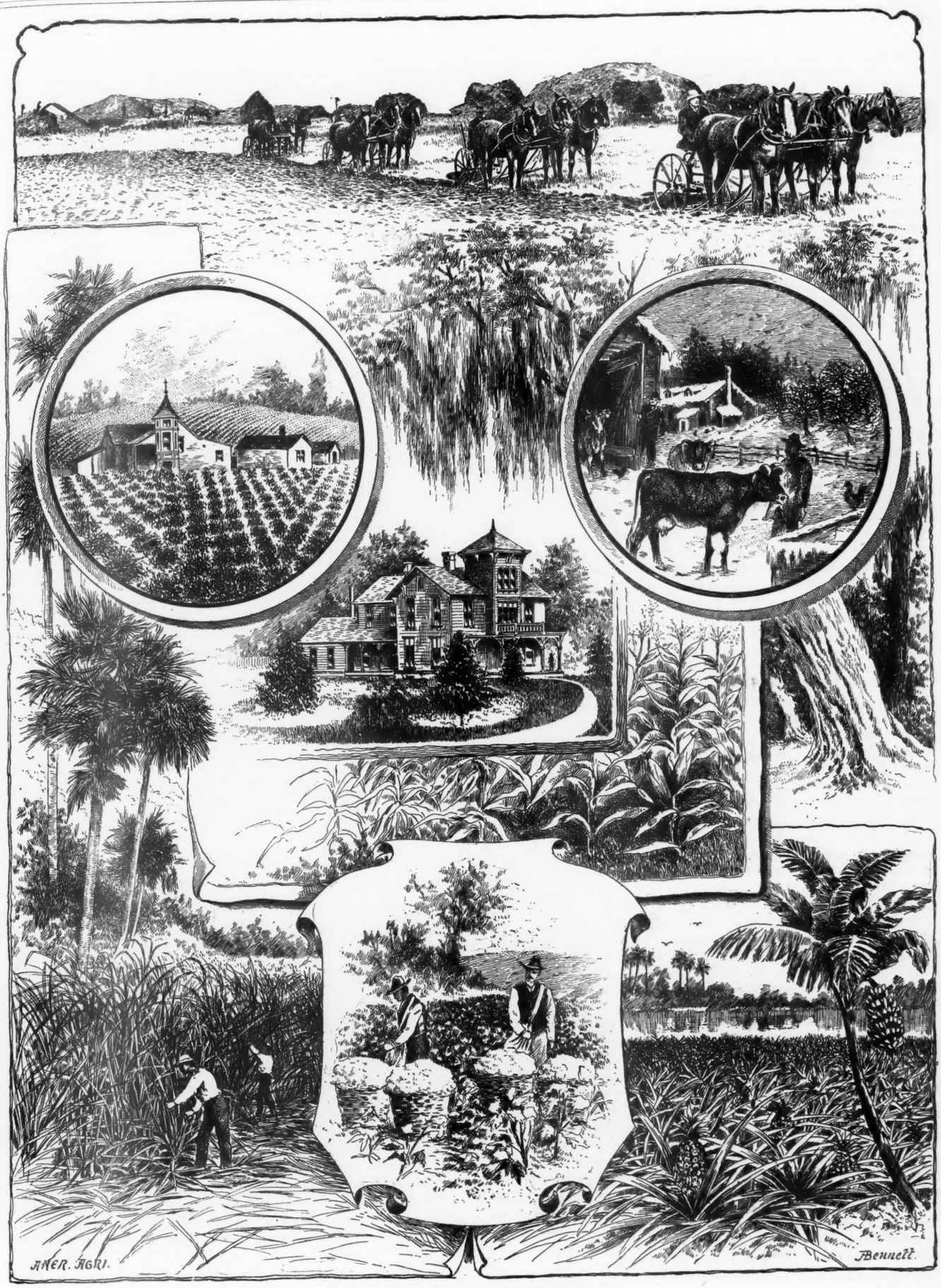
Economic entomology in the United States, as a special science, dates from the labors of Peck, Harris and Fitch about the middle of the century, and was ably continued by Walsh, LeBaron and others, yet living. The number of workers has particularly increased during the past three years, or since the establishment of the State Agricultural Experiment Stations. Thus, at the present time, almost every State and Territory has a salaried entomologist in some way connected with it, whereas, a few years ago the men thus able to devote their entire time and energies to investigations of injurious insects could be numbered on the fingers of one hand. The early work of half a century ago consisted chiefly of studies of the life habits of some of the commoner enemies of fruit and farm crops, especially of the older States, coupled with the recommendation of such simple remedies and preventive measures as a limited experience in a new and untried field permitted. Later work has resulted in a vast deal of more accurate information concerning some of the more important insect pests of agriculture. In many instances hidden secrets have yielded only to long years of patient investigation, while the best remedies have resulted from prolonged experiment in which the main object to be attained has been kept strictly in view.

To review the present status of applied entomology, with any attempt at thoroughness, is quite out of the question within the limits to which this article is confined, and the writer must content himself, therefore, with pointing out a few salient facts under the sub-divisions into which the subject naturally falls.

IMPORTANT RECENT WORK.

Up to twenty years ago, the means against injurious insects were confined almost entirely to the use of soap in some form or other, tobacco, pyrethrum, lime, and hand destruction; while the knowledge of the life-histories of the species in many cases left much to be ascertained. It is during the last fifteen years, or subsequent to the lives of the early writers just mentioned, that the great progress in applied entomology has been made. During that period many insects of national importance have been fully and satisfactorily studied. In the case of the Rocky Mountain locust (*Caloptenus spretus*), all that we know that is at all satisfactory, both as to habits and remedies, has been ascertained and published. The native home of the species, the laws governing its movements, all details in reference to its life history and satisfactory means of coping with the young have been ascertained. So with the cotton worm (*Aletia xylina*), the chinch bug (*Blissus leucopterus*), the Buffalo gnats (*Simulium* sp.), the scale-insects of the orange, the rust of the orange, the army worm (*Leucania unipuncta*), and many others that might be mentioned. A few cases, in addition to these, deserve special mention as illustrations of difficult problems solved after the most patient and prolonged investigation. Only four years ago the mooted points in the life history of the hop plant louse (*Phorodon humuli*) were cleared up and the full annual cycle of the insect established by following not only the development of the summer generations, but by proving that the winter egg is laid on the twigs of different species of plum. Practical, efficacious and thoroughly satisfactory remedies were obtained, and the hop-grower put in the way of easily controlling what had, up to that time, been the chief hindrance to profitable hop-growing. Another instance is afforded by the cottony cushion, or fluted scale (*Icerya purchasi*). The history of this insect, the manner in which it has spread over the orange groves of Southern California like a plague, destroying grove after grove until the people were discouraged in their efforts to control it, and the manner in which the little ladybird (*Vedalia cardinalis*) from Australia altered the whole aspect of things in the brief period of two years, is one of the most interesting chapters in the history of economic entomology. Writers have grown eloquent in their appreciation of the results in this instance, and yet those results followed years of patient correspondence and study, which alone justified the hopes finally realized and the sending of an agent to Australia for the one purpose of introducing the natural enemies of the scale.

Still another case is found in the grape phylloxera. It is now some twenty years ago that my studies of this insect, both in Europe and America, gave force to one of the most satisfactory preventive means against its attacks. This insect has perhaps done more harm to the wine-growing interests of European countries, and particularly of France, than all other insects combined. Hundreds of thousands of acres of ravaged vineyards in France alone have been reconstituted and made profitable by the use of American resistant stocks, and the work against this insect by these means may be said to be practically at an end in such departments of that country as Herault, Gard and Gironde, while the vine



"THE AMERICAN FARM HOME:
THE PRIDE, THE GLORY, THE STRENGTH OF OUR NATION." [*See Page 40.*]

growers of Algiers, Italy, Spain, Switzerland, Austria, and parts of our own State of California, are all battling against this insect by means of these same resistant vines, and are all more or less aided by their respective governments.

INSECTICIDES AND INSECTICIDE APPLIANCES.

The preëminence of the United States is in no way more notable than in the contrivance and discovery of insecticides and insecticide appliances for the practical control of injurious insects; for it may be said, without exaggeration, that the most satisfactory insecticides of general application and the best devices for their application, have originated in this country. Some of the more important advances in recent years have been (1) the discovery of the applicability of the arsenical poisons against biting and masticating insects, and the extension of their application to insects—like the plum curculio and the codlin moth — which were at first not thought to be amenable to treatment by them; (2) the discovery of simple methods of emulsifying kerosene and other oils so as to permit their ready dilution with water and subsequent use without injury to the foliage; (3) the use of resin washes; (4) the use of hydrocyanic acid gas, particularly against scale-insects, which are otherwise so difficult to deal with; (5) the applicability of the kerosene emulsion to underground insects, and as one of the most satisfactory washes against animal parasites; (6) the use of tobacco vapor; (7) the use of pyrethrum; (8) the use of bisulphide of carbon.

The devices for the application of either dry or liquid insecticides are so numerous that particular mention is out of the question. It suffices to say that the principle of the Riley or Cyclone nozzle has been generally adopted throughout the world in battling with injurious insects, and this more particularly in connection with the knapsack sprayer, of which there are now fifty or more patterns on the market. A large number of machines for more extensive applications have also been devised, both in this country and in Europe, so that we have suitable apparatus for almost every purpose. Important mechanical devices, aside from the knapsack sprayer and other spraying machines, are those for destroying locusts on a large scale, and for the subterranean injection of insecticides against root-inhabiting forms. The extent of the manufacture of machines of this sort may be realized from the statement that there are at least twenty-four firms in the United States turning out insecticide apparatus, and in France the number is fully as great or greater.

A phase of applied entomology that has of late years more particularly attracted attention and assumed prominence within the last year or two, is the use of contagious disease germs as insecticides. Much valuable work has been done in this country in this direction, and also in Russia, Germany, and France. The field is a very interesting one, and success has already been claimed in certain directions, especially in the destruction of the chinch bug in this country, and of the white grub in the Old World. In fact, an enterprising French firm is advertising the dessicated spores of a certain fungus that is known to destroy the white grub in Europe, while the legislature of Kansas last year voted an appropriation to permit more complete trial of the availability of some of the contagious diseases of the chinch bug.

The future, by reason of the large accession of workers, will doubtless be fraught with much advance in our knowledge of the life histories of species not yet completely studied, and the prompt dealing with new insects as they appear. There is not, however, so much to be hoped for in the way of new remedies, on account of the satisfactory nature of those now in use, but we may confidently expect advance in the cheapening of these, and in the fuller knowledge governing their more successful application. We may also look for cheaper and better apparatus, though not for radical changes in those already on the market.

Many of the questions that now confront economic entomologists are of an international character, and no great discovery is made in one section of the world that does not benefit all sections. The work of the future should show greater coöperation in broad lines of investigation, not only of the workers of this country, but of all countries. In this general statement, I would say in conclusion, that all the more important results that have proved of universal avail, and most of the more important facts upon which the advance in economic entomology has been made, have resulted from the work of officials, or those engaged in either State or government work. The history of the work, however, brings out very clearly one fact which should be a guide for future action, viz., that the results have been valuable according as the investigators have had freedom of action, and have proved abortive largely in proportion as political forces have influenced the work.

OUR GRAND AGRICULTURAL RESOURCES.

So vast and varied are the agricultural resources of the United States, that there is no day in all the year on which we are not harvesting in some section products from our soil. A glance at our illustration on the preceding page shows the diversity of these products, and tells why we may justly claim to be the best fed nation in the world.

Upon the Pacific slope we have the soil and climate that is best adapted to the products of the vine and the growing of citrus fruits. Within an incredibly short time vineyards and orchards have been planted there, and their fruits—grapes, oranges, lemons, olives, figs, apricots, prunes, as well as honey, etc., are now familiar in every market of our country. These, with their other products, such as wines, raisins, almonds, etc., will soon free us from any need of dependence upon the fruit regions of semi-tropical Europe.

The great Northwest is almost a synonym for "No. 1 Hard," and its development within two decades has been such that it might almost have supplied the world with wheat. In connection with the great corn fields of the Central Prairie States, it has furnished us an abundance of the staple food supplies, and has given us in most years a surplus to send abroad. If there are some who have thought that our limit of production in this direction has been reached, they have only to travel along our northern border and observe the great areas yet untouched by the plow. When a greater output is needed, it will be seen that our grain farmers of the next decade will surprise us as much as did those of the last.

In New England the dairy, the orchard, and the garden have largely taken the place of grain and stock. These industries are better adapted to the prevailing conditions, and proximity to the markets of the great manufacturing towns thus enables them to get the greatest return from their acres.

Throughout all the Middle South, cotton is king, and its production is so great that it is constantly the largest single item in the whole volume of our agricultural exports. Regarding this section, it may be noted in passing, that there is now a tendency toward a greater diversification of crops, and while there will not be less cotton grown in the aggregate, the individual farmer will place less entire dependence on this, and will aim to grow more of such crops as are needed for his own sustenance.

From the extreme southern portions of our territory we get, on the West, rice and sugar; and on the East the tropical fruits, such as the banana, cocoa nuts, guavas, and pineapple and, again, the citrus fruits, as in California, as well as an endless variety of subtropical products.

From this hasty glance at the different portions of our country, it will be seen that we produce within ourselves not only every necessity, but almost every luxury as well, that the soil can give. While some of these are confined within comparatively narrow bounds, others are common to almost our widest areas, and our system of internal communication and exchange is so good that even the special products of one section are easily and commonly obtained in all others. There is no other country in the world so favored by nature for the bountiful and diverse production of food; but what we have accomplished in this way must be taken only as an earnest of what we may yet do. Except within comparatively narrow limits we have not yet begun to test our powers of production. There are great grain fields yet to open in the North and West, and in the Southwest as well, when we shall have begun fully to avail ourselves of the aid of irrigation. There are fruit lands yet to be planted in California and Florida, and along our almost untouched Gulf Coast, and cotton has not yet begun to reach its limit.

So, however suggestive this illustration is in setting before us an idea of what has been done, its greatest value may be found by studying the opportunities that it still suggests. Young men who are industrious and ambitious, cannot do better than to turn their thoughts in this direction. So great is the diversity of employments offered that one may follow almost the untrammeled bent of his own inclinations in choosing his place and his work. There is no danger of over-doing. The United States is progressing so rapidly in population and so extending its commerce among nations that it will require our best efforts in agricultural development to keep pace with the general advance. Agriculture has never offered so many allurements, nor has it ever been so safe a calling, as it is with us to-day. Wherever industrious, intelligent, and persevering young farmers may cast their lot, be it East, or West, North or South, they may find within easy reach the means for the realization of their fondest hopes—the founding of a happy home, the aim of every true man and woman.

HOUSEHOLD

Good Old Times in New England.

CLARISSA POTTER.

Grandpa and grandma are always telling of "Good old times." They honestly believe that in the gone-by days of a half or three-fourths of a century ago, everything was better than now; not only the ways and morals, health and beliefs of the folks, but almost everything was far better, from the flavor and seasoning of the food to the climate and church. These dear old people admit that the old days were hard days; that John and I know nothing of the work and wear, the pinch and grind that they endured. But John talks hard times, too, and believes much care and fret are his, of which grandpa knew nothing.

"Good old times!" Yes, grandpa, in reference to hired help, they were good times.

Think of it, always plenty of first-class outdoor and indoor help to be had for the acceptance! Stout, willing, faithful young men and women stood ready and eager to seize any opportunity to "hire out," and so earn the needed dollar. Little else was there for them to do, but farm and housework, unless they ventured to the cities, where cotton and woolen mills, skirt, corset and shank, box and spool factories were yet unbuilded.

Blessed old days, when hired help was faithful, plenty and cheap! How passing strange it would seem to you and me, who have to scour the country for miles about to find that almost extinct blessing, or the reverse, a female who will hire to do house work, to have a dozen stout daughters of your tried neighbors, eager to work early and late for you, and then at nightfall milk a half dozen cows, and all for fifty cents a week.

Grandpa often tells how in the beginning of the haying seasons, sixty years ago, brawny men, with scythes on their shoulders, would come to the river's brink opposite this farm house, and lustily shout, "Want a man for haying?" and turn away with evident disappointment when the answer "No" was rung back. Haying wages were then "two and three pence" a day.

Grandma distinctly remembers when malignant typhus fever raged in her father's family when she was a child, and how the girls in that, or near neighborhoods, thinking a household so stricken might give them opportunity to secure work, came in person to the fever-pestered home, soliciting work, and successfully, until great-grandma, through the worst of the seige, had seven hired girls helping her. Good times, surely, those were in contrast with the present when any family, if so afflicted and dependent on hired help, must suffer for care.

"In my day, there was *wear* in clothes and boots," grandpa affirms when the children clamor of holes in some new garment. "Everything, nowadays, is cheap, made to sell."

When grandma was a little girl her two everyday summer "frocks" of homespun and woven tow and linen, and one winter dress of checked woolen, cut with plain waist and full skirt—"Gretchen," we now call the same simple old pattern—were so stout, one little girl could not outwear them, but they were handed down the line of numerous daughters in the household.

Heels and toes, elbows and knees! Why, the grandmas didn't begin to have so many to patch as do the mothers of 1891, because they lived before the day of shoddy. I wouldn't be one bit afraid to swap my mending basket for grandma's, if she did raise ten children, and I but four.

Think of the old leather gallouses, soft and flexible as kid, that bore forty years' wear without a break, when you are mending your boy's pasteboard-stayed suspenders, bought not two months before.

And the boots! Yes, boots, and rubbers, and felts, and moccasins, and leggings, and arctics that our men folks stack about the stove to dry every winter evening and snowy day! They clutter the floor and befoul the air with their strong odor of overheated rubber, steaming leather, and sweated stockings.

When grandpa was a child, every man and boy had his one pair of cowhide boots, heavy and clumsy enough, but readily dried and capable of being kept water-tight with a secret compound of bear's oil, mutton tallow and bayberry wax. Grandfather regretfully speaks of those pliable, grease-soaked old cowhides, claiming that they kept the feet more dry and healthy than all the foot gear of the present day. Legions of them there are, dainty, buttoned, buckled, tasseled affairs, but they don't wear, and they do cost.

Oh! ho! But think of the strides ahead farm machinery has made in the past fifty years! Who wants to go back to the days when all the mowing and harvesting was done by hand! Blistered hands, they often were, too, before the last grain field was cut and cradled.

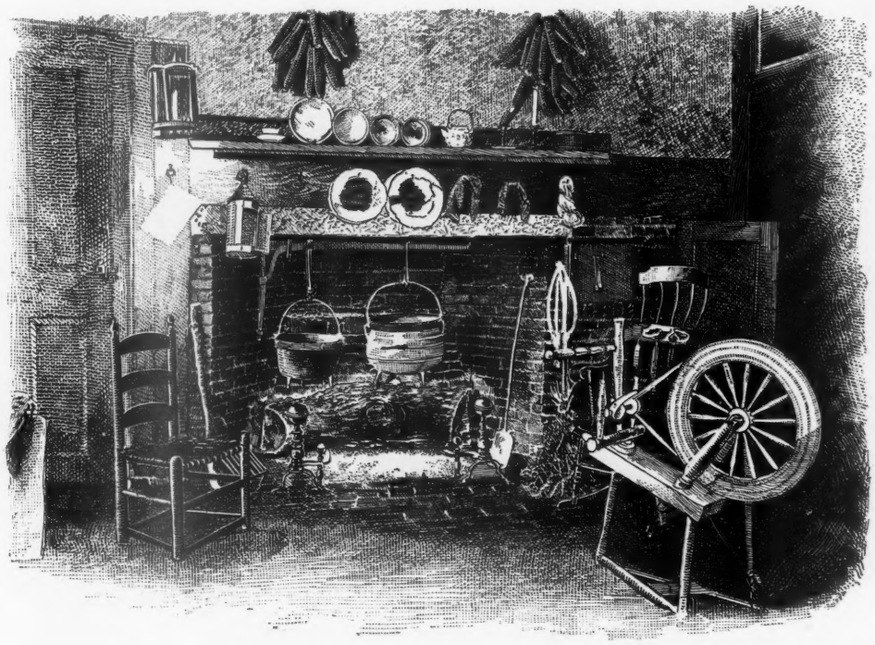
"Machinery, machinery!" grandpa said, thoughtfully, when I asked him concerning the farm helps he had half a century ago. "Why, we had plows and harrows, and our scythes and hoes, and,—yes, father had a horse rake, a straight-headed one, rigged with tugs without wheels and with big wooden stub teeth that slid along the ground, rooting it, if not hung just right, and scratched the hay into windrows. When full, the rake was boosted and emptied by hand."

"'Mowers and tedders, planters and spreaders, horse hoes, grain sowers and reapers?' No, child, fifty years ago we never had heard of them, no more than had your grandmother of sewing machines, clothes wringers and apple parers. Hard hand work did it all. Often it was October before the last swale was cut, and potatoes—we thought nothing of digging after the ground had frozen for the winter."

Thirty-six years ago grandpa bought the second mowing machine that ever came into the State. It was a Ketchum, and did fair work, although it had but one wheel and could not be thrown out of gear. People, for miles around, came to see it work, thinking it a wonderful affair. It must have been heavy, as well as clumsy, for years afterwards, grandpa was loading oats to haul to a distant market, and having plenty of room, thought it a good opportunity to carry the worn out machine, with a kettleful of other junk, to market as old iron.

"The horses did seem all petered out when we got to town," grandpa said, grimly smiling at the remembrance, "but I never reckoned I had on

A HORSE RAKE OF THE OLDEN TIME.



THE FIRE-PLACE OF THE GOOD OLD DAYS.

such a load until the old iron weighed out nine hundred pounds besides the oats."

A half century ago, butter sold at nine cents a pound. It was gathered in up-and-down dash churns, either of wood or stone. Jersey cows and butter coloring stuffs were not in the market, but the public had never tasted gilt edged dairy productions, and were not so exacting as now. Butter was butter.

The winter market was slow, and grandma batted her churnings with heavy club paddles into wabbly two-pound bricks—white as lard they

THE UP-AND-DOWN DASH CHURN.

were—through the winter months. These were dumped into a barrel and kept in freezing quarters until the glut was off the market, and then it readily sold.

The cream thermometer of that time was the housewife's work-grimed finger. On churning day, in freezing weather, the pot of chilled cream was brought in and placed on the warm bricks of the hearth. As it thawed, again and again, its temperature was tested by this finger thermometer, as inaccurate as it was unclean. Frequently a whole day's hard pounding would not fetch the butter, in spite of hanging a horseshoe on the churn, adding to the cream a wad of wet rags, a sprinkle of salt, sugar and vinegar and other ingenious resorts.

Nowadays, who would buy such a grade of butter! Only the best, as sweet and fresh as dew-beaded clover, as clean as a June sky and dressed in daintiest mold, will satisfy our butter educated public, and blessings on it for forcing the dairy up to such a standard. Wouldn't the old housewives have opened their eyes to see the perfect dairy appurtenances we now have for making nut-flavored, wax-grained, perfect butter!

Fifty years ago, more home-cured cheese than now, was made. Without creameries, ice safes, cemented, airy cellars, or common sense planned, cool north milk butteries, it was necessary, for butter they could not make during hot weather. Good cheese, it was, too, grandma affirms, only crumbly with oversalting, and strong with jug rennet. All the housewives of grandma's knowledge used "jug rennet." The more dreadful it smelled, the more virtue it had, was their sorry belief, and by keeping their rennet in a small nozzled jug, year in and year out, without cleansing, those old cheese makers could readily and surely brew fearful breaths in their rennet jugs. Grandma annually made about sixty twenty-pound cheese, and always gave them winter storage. Toward spring, they sold like hot cakes, and if "stratered" with green mould, still quicker demand they had.

Winter-laid eggs were not expected in "good old times," and phenomenal, almost, they would have been with the wretched care the poor biddies then received. They were "wintered out" as cheaply as possible on whole grain and barnyard scratchings, without warm feed or any provision made for gravel, lime and dusting, that we now know are so necessary for poultry. Frequently, they roosted out of doors, and their warmest quarters were drafty corners of the hog house, or an open shed. Little wonder was it that their egg basket went dry from November to April, and that for winter consumption every forehanded housewife must depend on a firkin of August-laid eggs, packed down in rock salt.

One day grandma said she was hungry for a taste of good old fireplace cookery, like what she made before cook stoves were invented. The children scudded up into the attic for an ancient tin baker stored there, and grandma stirred a Johnny cake and baked it in the baker before an open fire. She turned the cake twice, slipping the sheet from the queer old tin, thinking to secure an even bake, but she didn't; one side was raw and the other scorched, and both were peppered with white ashes, and tasted smoky. Grandma admitted the cake wasn't half as good as those we bake in our cook stove, and acknowledged it was the hearty hunger of healthy childhood, a stinted diet, and not the manner of making and cooking those old dishes that made them taste so good. A half dozen of these by-gone fireplace bakers are stored under our attic eaves, along with a rusty tin "kitchen," with snout nose for drainage of drippings, and cunning swing door through which to watch the roasting of huge beef cuts and spare ribs. Queer enough they must have looked, mounted on their crooked, grasshopper legs and placed in a row close to the hot coals of the wide fireplace, buckwheat cake and Johnny cake baking away, with now and then an overturn from some meddling little foot, and an occasional sift and smooch from flying ashes and falling embers. Smoke flavored, top scorched and raw bottomed, of course, they were, but keenly relished by the crowd of hungry children who were allowed no pickings between meals.

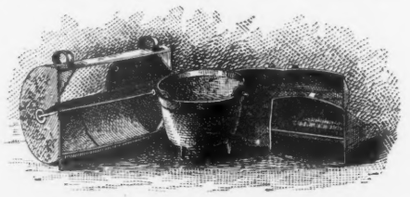
"We thought them the greatest invention possible," Grandma said of these tin bakers. "Before their advent mother made spider cakes and baked drop cakes on green maple chips. The dough was made stiff and spatted upon smooth, clean, green chips. These were canted just right before the fire and baked."

Great-grandmother's iron "bake kettle" is still without rust or crack. It has a heavy, close-fitting iron cover with inch-wide, turn-up rim, on which shovelfuls of hot coals were placed when the stewing meat it contained needed faster cooking, and three long straddling legs on which, for two generations, it roosted over hot coal beds in some corner of the big, glowing fireplace.

But the bulk of all gone-by cookery was done in brick ovens. Hard baking days, you and I think we have, but let us be thankful we do not need to blister our faces and singe our brows over swinging cranes and dangling pot hooks in red-hot fireplaces, nor pestle-pound all spices used, nor need to make our soda by burning cobs, and bottling and watering the little heap of white ashes thus obtained.

The march of years brought steady improvements in methods and means, both indoors and out. The tallow dip gave place to the mold candle, the whale oil lamp, the camphene flame, the kerosene blaze, and now to the strong light of gas and the electric current.

The herring-bone sanded floor of the "fore room," with its canopied bed and burnished andirons, and great kitchen with its cupboard of pewter dishes, its "settle" and clutter of loom and swifts; spinning wheels and reel; cradle and runged ladder, leading to the overhead loft, long ago gave place to more commodious, convenient farm homes, affording more possibilities of comfort, but demanding much more work and care to keep in order. Our country is now so filled with



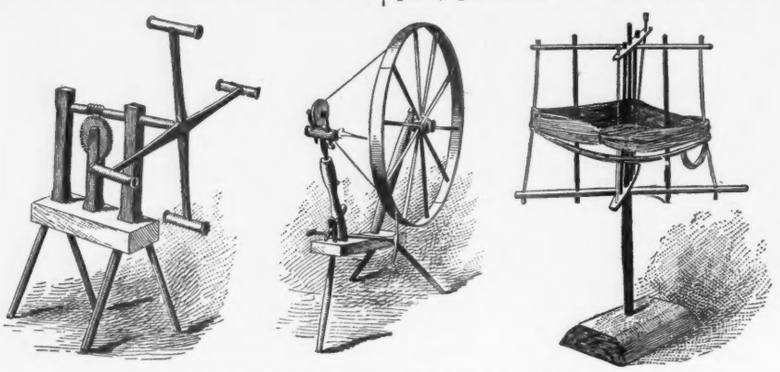
BAKE-KETTLE AND "TIN KITCHEN."

busy mills and factories, the slow home work of hand wheel and loom is unnecessary, and, under garret eaves, covered with dust and cobwebs, they rest.

With tenderest respect for our beloved ancestors, who long have slept on hillside and hilltop, with faces toward the east, waiting for the resurrection morning, we are compelled to believe they never learned how to spare themselves hard work. They had more strength than common sense in some matters. They builded their homes with no consideration whatever as to *steps*. The ingenuity they exercised in planning kitchens and butteries in detached regions, stumbling doorstep sills, air-choked-off shutters that to draw required stomach wrenching jerks, and furniture so ponderous, the strength expended in moving it would have raised the health ratio of this generation a goodly per cent., was wonderful. The massive oak bedsteads and tables, without castors, and heavy as metal, that daily required lifting back and forth from the wall, have given place to light, comfortable furniture that run on our hardwood, oiled floors as lightly as a toy wheel.

Thankful are we that we did not live in old-time days of littering cedar brooms, and heavy earthen pans; ponderous iron dinner-pots, and water-logged water buckets, bulky wooden dough and butter trays and curd tubs, all of them just as big and heavy as they could be made. Give us these days of light, strong granite and white iron culinary ware, that is made for comfortable use, and not to test muscle and develop gymnasts, or—kill the housewife.

Why! the other day I weighed the iron cover of grandma's old nutcake kettle—just the cover—and it weighed ten pounds! Kettle, lard, and all, what must it have weighed? How grandma's slight frame must have doubled and strained, lifting and tugging about that miserable old kettle the forty years she speared nutcakes from it!



GRANDMA'S SPINNING-WHEEL, REEL, AND SWIFTS.

"Good old times!" Yes, but these are better, if we do have curculios, potato bugs, and black rot to battle, and fearful sieges with la grippe, that hydra-headed monster.

Good days, these, for the individual and for the public, with mission and Chautauqua, fresh air and literary circles thriftily increasing.

Good days for the Church, growing each year purer and stronger, and good days, these, for the homes with suggestions and means for giving them more beauty and comfort and happiness within every one's reach, and more and more determination to make them true homes—*havens.*

An Historical Episode of Our Far West.

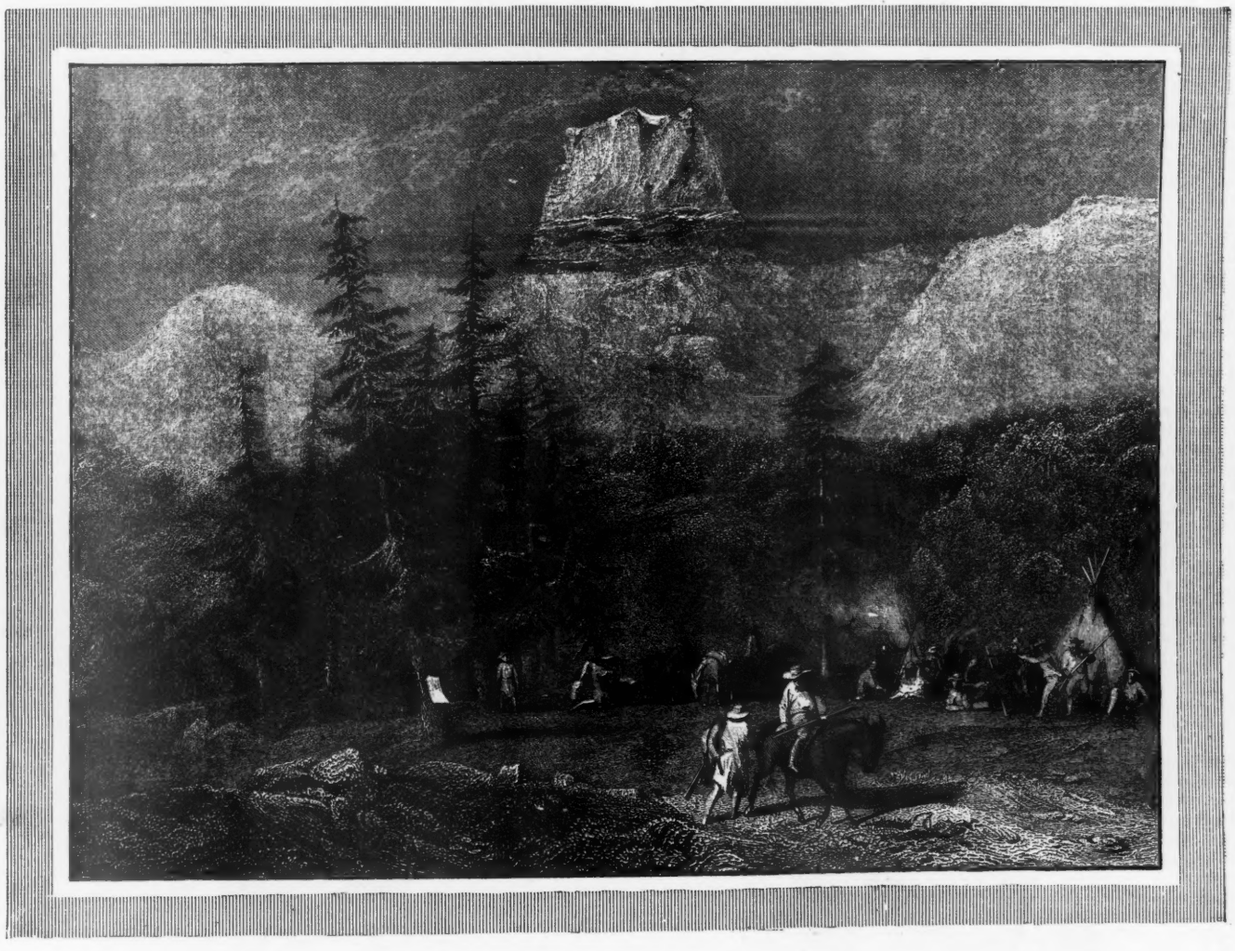
JESSIE BENTON FREMONT.

"Every man of us was a Captain; there was no orders given—we knew what to do." This was Carson's expression in telling of one of the most eventful of their many dangerous experiences with hostile Indians; a night attack on which hinged the future of California. Carson was an exceptional man, even among picked men, but this self-reliant, instant-putting thought into action as the occasion demanded, has remained with me as the true American type which carried the Star of Empire Westward while its advance still depended on individual effort. This "thinking unit" was the result of older communities where thought was shaped through family, church and school and tradition, but it had gained expansion and unhesitating action from the new unlimited West, and developed a newer and more daring variety of the settlers of the Eastern coast where for a long time the hampering influences of the Old World unconsciously fettered the mind; while both, East and West, retained the indestructible vitality of the good seed of justice and order, and individual responsibility as well as individual action—our inalienable Saxon inheritance. Emerson says the good or bad qualities of a family are often condensed into some one member, making utter unlikeness of character to the rest. As a nation we realize this in the exaggerated local types, both Eastern and Western, which have furnished models for so much amusing clever writing—nowhere more exceptional, though true as well as amusing, than in the West.

But Bret Harte's "Outcasts," and his bandit miners with a single virtue and a thousand crimes, are not the men who opened up the Far West—not the men who carried with them the law as well as the rifle and the axe; who put down the dawning of communism; who planted schools and churches as fast as they opened up mines and sowed grain, and who lived up to the best traditions of the 1776 days when they were told England was again to be met on this further coast. In no part of our history has individual character and volunteered action produced a result so full of grand results as in the acquiring of this Pacific Coast Empire; like the little lakes and mountain springs that make the heads of a mighty river, the pioneers of this Far West were the sources of a noble stream of national importance, and of enriching and saving value in our time of national need.

The opening act in the drama of its acquisition was on the night of which Carson spoke; at a moment when no orders could be given in the sudden treacherous onslaught of the most warlike Indians of the Coast, the Modocs of the Bad Lands, the lava-bed country bordering Oregon in the north of California, an absolutely unknown land then, with giant pine forests covering the magnificent mountain range and its extinct volcanoes. Near the snow peaks of Shasta were these Indians, across whose wild country had to pass the small exploring party of Frémont, then a Captain of Topographical Engineers. He had been eleven months without knowledge of what was taking place in the outer world—the isolation of mind was as profound as the isolation of the new lands through which searching exploration carried him, and the brief stay in California settlements had brought only knowledge of local interest.

He had waited in vain the promised signal for action on plans matured in Washington, and fully discussed in very different surroundings, chiefly in the quiet sunny library of my father's house where Mr. Buchanan and Mr. Bancroft, representing the Government as Secretary of State and Secretary of Navy, the enlightened Senator John A. Dix of New York, and the late Minister from Germany, Baron von Gerolt, met in council with my father and Mr. Frémont, on the need for arresting England's designs on the Pacific Coast. Each of these men had his special sources of information, both official and personal; each had his special point of view and interest in the large question, while the execution of all focused on Mr. Frémont, who was to be on the ground there, fully informed, and ready to act for his government and for his country when the time for action came. And of this time he was to be the judge, though every effort would be made to send him the signal. He had lingered all that he could venture near our ships of war at San Francisco, but no word came. It had been a responsibility to go



FOREST CAMP, SHASTL PEAK.

—an equal one to remain. They had now left all settlements far to the south, and were in these wildest of "bad-lands" and bad Indians nearing the Oregon frontier. Giving himself to the rapture of an explorer in an unknown land—since he must renounce the keen delight of conquest—Mr. Frémont was standing by the camp fire thinking of these two openings, and while regretting the one, feeling the traveler instinct rising with the unknown, when a strange sound was heard, as startling there where the living had no place as would be ghostly presence in a quiet room. And as he listened, from out the black dark of the night and the forest emerged two men on horseback—white men, friends—one, the blacksmith of the previous expedition, Neal, a good man whom he had let remain at Sutter's when they had reached there two years before and recruited in that enchanted valley after their starving and freezing in the Sierra. Neal had made money as the blacksmith of a growing prosperous community and owned his ranch, and cattle and horses, and tasted the sweets of well-earned success and repose after

toil. But to him had come the appeal of duty for his country, and he left security and ease to pilot through certain dangers the Government messenger, a naval officer who was bid to "find Frémont wherever he might be." For an officer

> Theirs not to reason why,
> Theirs but to do—or die,

but Neal was the true American volunteer who has never failed our flag. Six hundred miles they had followed Frémont through unknown country and, toward the last, increasingly hostile Indians. So alarmed was Neal's experienced mind by these that Mr. Gillespie sent him forward to overtake Frémont and inform them of their situation. Neal with one man hastened ahead to where his woodsman's eye saw a large party had passed recently. He had bravely earned the joyful welcome given him, and at once everything was made ready for the daybreak start to relieve Gillespie, and for the main body to follow and join them, for Frémont feared to separate his small force. He had selected to go with him on the more rapid ride, nine of his best men—Carson, (always Carson) Godey, Carson's equal, and a great favorite with Frémont, Dick Owens, more serious than the gay-hearted St. Louis Frenchman Godey, but as reliable, prompt, self-acting, as Carson and Godey; and the fine shot, Stepp, and Basil Lajeunnesse, another St. Louis Frenchman, all loved and trusted, and four of the invaluable Delaware chiefs. These *ten did not know the word "Impossible." Years of shared dangers and mutual support had made of them one mind in emergencies; like globules of quicksilver they were perfect separate, and equally perfect combined, and as sure and swift in combining. They realized to the full all dangers, and where prudence and skill could avert them it was always the preferred way; but that instinct which gives "a ruthless joy in battle" was keen in each, and rose exultingly when battle was the only way left.

They took the backward trail at dawn, and a hard day's mountain ride of forty miles brought them to a meeting with the hurrying forward officer and his three men, a glad meeting, for they had feared the Indians previously met, but there had been no signs of these to either party, and this led to fatal security. For the second time in all his years of travel Mr. Frémont stationed no guard; every one was very tired, for excitement had kept the men up late talking with their old comrade Neal; while Mr. Gillespie and Mr. Frémont had the absorbing interest of going over the news of almost a year as well as their own parts in the government plan for California. Mr. Gillespie was known to, and trusted by the Secretary of the Navy, and by him, and by the President, he had been accredited and was fully informed of their designs relating to California. For the first time since leaving Washington—almost a year—Mr. Frémont had the relief and pleasure of opening his mind to another mind informed as his was, and having later and decisive knowledge. It was a fateful talk those two young officers had by that mountain camp-fire, and on a fateful date, for Neal reached him the 8th, and the 8th and 9th of May, 1846, were the opening battles of the Mexican war. While these young officers talked of the "coming war" its dead already lay on the fields of Palo Alto and Resaca de la Palma. But this they could not know, when Frémont shaped his acts on individual responsibility. At last Gillespie, tired out, went to his sleep; only Mr. Frémont of all the camp of sixteen men remained waking. On him centered the far-sighted views of my father, the philosophical hopes of Mr. Bancroft, and the general plan of the Government to extend our territory, and, by forestalling, defeat England here as in Oregon. Mr. Gillespie had brought the signal; it was for Frémont to take the responsibility, for the confidential instructions said "ACT."

*Frémont and the nine here named—ten in all.

SAGUNDAI, THE DELAWARE CHIEF.

"*The time has come. England must not get a foothold, we must be first. Act discreetly, but positively.*"

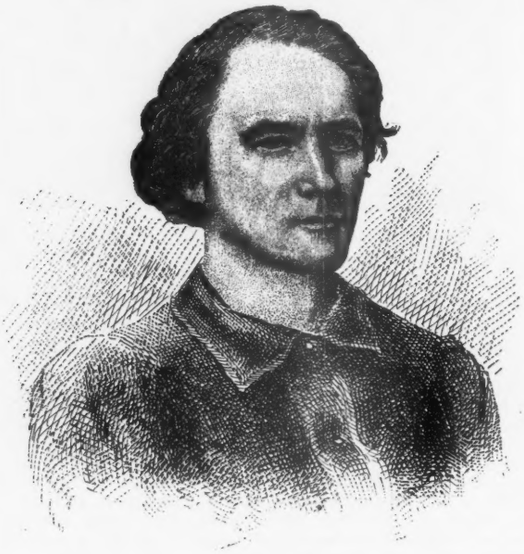
What crowds of thoughts filled that brain! And what crowding feelings filled the heart of him who for the first time in those long, long months had letters from home. Sleep was impossible. A sudden movement among the animals startled Mr. Frémont from his thoughts and drawing a revolver he went among them; they were only about a hundred yards away. There was no sign of Indians, and the animals were quieted by his presence, even the mules resuming their eating.

Then going back to the fire the home letters were read again. The clear resolve was made to return to the Sacramento valley, and bring to bear all the influences he could command; acting with extremest discretion until war should be declared, but relying on Carson and some others of his party to secure the alliance of the incoming emigration. The naval force had its orders to act as soon as hostilities commenced, but no time must be lost to forestall English action, and for that citizen aid was needed.

The citizen party under Mr. Frémont's command, chosen for this contingency, was made up of well known and picked men, "every man a Captain," and though small in number was a formidable nucleus for frontier warfare, and would command the confidence of both settlers and the incoming emigrants. With this settled decision came enough rest of mind for sleep; but barely had sleep come when Mr. Frémont was waked by Carson's voice calling to Basil to know "what was the matter over there?" No answer. Then immediately the camp was roused by the cry from Carson and Owens who were lying together—that cry the West knows—Indians! Basil the happy-hearted, the favorite with all, was killed. It was the sound of the axe driven into Basil's head that had waked Carson. One of the Delawares had been killed with arrows, and another Delaware was shot full of arrows, but he sent his enemy before him to the Spirit land. This was the leader of the Tlamaths, and a desperate but fruitless effort was made by his people to carry off his body, the prolonged fight only ending with the grey of the morning; when *Sagundai*, a great Delaware chief, executed Indian law of vengeance by scalping the Tlamath. It was a singularly interesting night, blending the intellectual contest for power of the highest civilized nations and the rudest savage warfare—both necessary parts of the whole but rarely brought into such sharply defined juxtaposition, as on this occasion.

Indians never attack at a disadvantage, and when these had made the approach to the sleeping camp and found the fright of the mules brought out an armed man, they retreated to return later. Had that one head which held the plans of the Government been laid low—that heart and head been taken from his faithful followers—the long thought and work of years, and the daring un-

FREMONT THE LEADER.



KIT CARSON.

flinching work to follow, would have come to nought. On single lives sometimes great events hinge. Had Gillespie not had good fortune, as well as patient tact, when crossing the enemy's country of Mexico in the disguise of a Spanish trader, the letters and authority sent through him to Mr. Frémont would have failed to reach safety on our war vessels at Mazatlan. From there, up the coast to Monterey in California was rest and safety. Then renewed danger. Had Neal been loth to leave his new found prosperity, and ease Gillespie could in no one else have found the experience, and knowledge of his old Captain's methods of camp and travel, which led Neal on from one probable place to another like a trained pointer until he stood in presence there. Within, and above the trained Neal, was Neal the American, who like the Minute men of the Revolution only needed to hear his country's call to answer "READY."

There is not space to tell of the sudden, complete punishment inflicted by the combined camp on the Tlamaths. There must be legends among them yet of their burned villages, their destroyed boats and fishing nets and stores of dried fish; and of the many warriors killed; "the women and children we did not interfere with" says Carson. Nor of the angry Delawares, who did not wash off their mourning paint until many scalps had been taken to carry back to the relatives of the murdered Delawares. At first Chief Swonok kept his head down, and only answered his friend and Captain by striking his hand against his broad breast, "Very sick here. Delaware all sick." After, with eyes glittering and face relaxed, Swonok said, "Captain, better now; very sick before; better now." Then followed the fast return to the settlements where the agitated settlers and incoming emigrants were alive to the impression of authorized aid, though "discretion" had still to rule all action; but that mysterious contagion of disturbance peculiar to war times was felt, and the animated friendly relations of the naval force with Frémont, together with the judicious influence of Carson and some few trusted men, assured Americans that their country needed their aid. They gave it—instinctively. After their long toilsome, overland journey, in the moment of assured rest, they were asked to support the flag raised by Frémont. They could not know so much was left to his discretion that in taking this step he also prepared the way for his government to "disavow" him, if for reasons of state he should be judged to have exceeded his powers, by first writing out his resignation and sending it through Captain Montgomery U. S. Navy, in order that it might stand the act of a citizen. But they saw only their own country's dear flag and they left all to follow it; giving without stipulation, themselves, their wagons and teams, their arms, and leaving their families. It was the spirit of '76, incomprehensible, because unattainable, to European military authority. Von Moltke called our magnificent volunteer army of the late war "only an organized mob" but what can discipline and years of highest training do to produce such invincible spirit in action, such motive in endurance, and such instant noble return to the duties of citizens in peace?

These few hundred men exemplified some of the best national qualities; and in the months of their organized service under Frémont earned the trust and respect of the native settlers. As a body they could be relied upon to willingly obey the strict orders to respect property and person; and when in 1849 Mr. Frémont took me a camping-travel over that line of march, everywhere, on solitary ranchos, and in little settlements, women came to me with grateful thanks for the sure protection they had received in that time of general disorder—for the "thinking unit" was in quick accord with the commander. On him alone rested every responsibility, but his task would have been impossible without the comprehension, the sympathy, the unquestioning aid, of his faithful exploring party, and the Pioneers.

As his action had determined that of Commodore Sloat, the individual action becomes more narrowed down; and gives historic value to the night attack of the Tlamaths when that one life, with such large results centered in it, was in the power of a Modoc Indian.

The Washerwomen of the World.

FRANK G. CARPENTER.

Rat, tat, tat, tat!
Rat, tat, tat, tat!
Rat, tat, tat, tat, and a rat, tat, tat, tat!

This sound came from every house as I walked one sunny day through the dirty streets of Seoul, the capital of Korea. The sound was not an unmusical one, and for a time I thought it must be the result of some amusement which was going on within the mud huts about me. I asked my guide and he told me that it was merely the women ironing the clothes of their families. No men in

ORIENTAL HOUSEKEEPING.

the world wear more gorgeous clothes than the Koreans. Their costume consists of baggy pantaloons of white, so full that they could be pulled up and tied around the throat, and still fall in zouave folds at the ankles. They are, however, tied about the waist and there are shirts above these, and over the whole there is a long, wide-sleeved garment of the most spotless white, sky-blue, or light pink, and the average Korean man looks as though he had just stepped out of a bandbox. The clothing of the lower classes is of white, and in approaching Korea on the ship you see these white-gowned men strutting along over the hills and you think you are approaching the land of ghosts. Woman, in Korea, is little more than a slave, and the chief business of a wife is to keep her husband's clothes in order and, if she be not rich, a large part of her existence is devoted to washing and ironing. Wash-day in Korea comes oftener than once a week, and the ironing for the family of a Korean dude is a work of several days. Every nation washes its clothes differently. Korean clothes washing is done without a fire. As I was carried through the country in a chair, swung between two poles by eight of these men dressed in white, I saw, from time to time, women squatting on the banks of a stream with piles of clothes beside them. The clothes had been ripped up for washing, and the different parts of the garments were washed separately, and laid out on the grass to dry. They washed by pounding rather than rubbing, and the women dropped the clothes into the stream and then laid them on stones and pounded the dirt out of them. When dry they carried them home on their heads, and the process of ironing, which made the music about which I was so curious, began. Korean ironing is done by means of round wooden sticks. The clothes are carefully folded and laid on a flat block of wood, and a woman squats herself flat on the floor beside this, and pounds away at the clothes until she has made the fiber take on a polish equal to that of any Chinese laundryman. Often, two women work together. They keep time as they play at tattoo on the block, and gossip away between the strikes. The Koreans use no soap in washing and there is no starch put into the clothes. The labor is of the hardest kind, and the woman has not the satisfaction of knowing that she is going to wear the clothes herself. Her own garments are much less pretentious, as a rule, and the restrictions of her sex are such that had she good clothes she would not be able to show them to other men than those of her own family.

The Japanese rip up all their clothes before washing. They sew the garments together with long stitches, and they are so made that any woman can put her own dress together without trouble, and the average woman re-makes her house dress once a month until it is worn out. The Japanese washtub is about as big around as a family dishpan. It is not over eight inches deep, and it sits flat on the ground while the washing is done. The Japanese girl gets down on her knees, and scrubs the clothes of the family by rubbing them to and fro between her hands. She has no washboard and a thin bar of Japanese soap, two inches square, is her only assistant in cleansing. I visited Japan in the summer and I noted that the dress of the women, while washing, was decidedly scant. Some had no clothes on, to speak of, and I saw no signs of hot water being used. Each woman had one or more ironing boards standing up beside her tub, and the Japanese woman does not use a flatiron nor the clothes line. She spreads her clothing flat out on these smooth, white boards, and they dry under the sun with a polish almost equal to that of the iron. You see these ironing boards everywhere in Japan. They are five feet long and eighteen inches wide and, where the clothes are ripped up before washing, they make them dry without a wrinkle, and they appear as stiff as though they were starched. The common clothes of the Japanese are very simple and there is but little difference between that of the women and the men. The favorite color is blue, cotton, with the extraordinary decorations of which the Japanese are so fond. The best clothes are reserved only for special occasions and the wonderful silks and satins of Japan are, of course, not washed. The Japanese ladies spend more on their clothes than the men, and a fashionable dress of a well-to-do lady is often worth as much as two hundred dollars, while the wife of a merchant or a shop-keeper may wear at a party one which has cost at least fifty dollars. A gentleman's dress rarely costs more than sixty dollars, though in times past they have been much more expensive.

I was much amused during my stay among the Siamese at Bangkok in watching the washing along the Menam river. Bangkok has about one hundred thousand people living in floating houses on this river, and the whole of the Siamese capital, containing more than half a million, lives on the edge of the water, either on the river or on canals. The floating houses have porches, with steps leading down into the water, and the average Siamese dress consists of a strip, about the size of a Turkish towel, and often, in fact,

a Turkish towel, across the shoulders and a long waist-cloth which falls below the knees and is there pulled through from behind and tucked in at the waist in front. The Siamese men and women practically wear the same costume and when they take a bath they do their washing. All are expected to wash their own clothes, and they step down into the water with their clothes on, and take them off and give them a good wringing when they get out. They have dry clothes ready to put on as they remove them, and you may see this washing going on at any hour in Bangkok. Many of the women dress in very light attire and some of those who scull the boats on the river wear nothing above the waist. They have well-rounded forms and they are as straight as the oars they use. They are wonderfully supple, and this suppleness is cultivated by the people, and young girls are taught to bend their joints this way and that in order to increase it. On this account the scenes along the Menam river show you many beautiful forms, and a sculptor might find a model for a Venus on every block. The washing of the clothing of the children of Siam and Japan costs but little, for the babies of both countries wear little more than a bib, and I saw many little girls of four and five whose sole attire consisted of a little metal disk as big as a trade-dollar, which was fastened by a string around the

KOREAN WASHERWOMAN GOING HOME.

waist, while the Siamese boys get along very well with a string of beads and some yellow powder, which serves to keep away the mosquitoes.

In the Straits of Malacca and in India the clothes washing is largely done by pounding the wet garments upon the stones of a stream. The washing is often done by men, and the Klings of southern India are frequently the washers. While at work they have nothing but a cloth about their loins. They are lean but muscular, and their skins shine like oiled ebony under the hot sun of the tropics. They lift the clothes up in the air and bring them down with a swing upon the stones, and woe unto the Englishman's shirt and duck pantaloons if they happen to be decorated with buttons. The washing in India is often combined with praying, and I saw thousands of women and men on the banks of the Ganges making their prayers and, after they were through, rubbing clean the clothes in which they had stood in the water while praying. The clothing of the common people of India is largely white, and in the case of many classes it consists of a long sheet which is wound about the form of the man or woman, and made, I should judge, without very much sewing. The widows of India wear the plainest of cotton clothes, and they are not permitted to wash their clothes or change them for thirteen days after the death of their husbands. The Hindoos believe that the more miserable a man's widow is on earth, the happier will be the man in heaven, and the relatives of the deceased do all they can to injure the widow. When the husband is cremated, as is the custom in India, the cremation takes place near a river or tank, and the widow is shoved into the water and made to stay there in her wet clothes until the dead body has been burned to ashes. She is led home in her soaking garments and is made to sleep in them on

WASHING IN JAPAN.

the bare ground. She cannot change these clothes until thirteen days after the funeral and for the rest of her life she is an outcast.

In nearly all the countries of the Orient, water is scarce. Wells are comparatively few and India, Palestine, Egypt, and Turkey have their water carriers. The water in India and Egypt is carried in pigskins or goatskins on the backs of men, and water carrying is a regular profession. It costs too much to use a great amount of water so gotten for washing, and much of the laundry work is done in the streams. Along the banks of the Nile I saw many women washing, and men, half naked, here and there pounded the dirt out of clothes by beating them on the stones in the same way as I described the Klings as doing in India. I remember seeing men, stark naked, washing clothes in this way in the Nile at Asyoot, the capital of Upper Egypt, and this was on the edge of a city of about fifty thousand people. Nearly all the water of Egypt comes from the Nile and such washing as is done at home is with water, which the women carry in great jars on their heads. They balance these jars perfectly and walk along without touching them. I have seen a woman, with a heavy jar of water on her head and a baby on her shoulder, walking along without the least concern as to the falling of her burdens.

The washerwomen of Europe are quite as curious as those of the Orient, and a great part of the

SCOTCH WOMEN TREADING OUT THE DIRT.

washing is there done with cold water and along the streams. Much of the washing of Paris goes on at the public washhouses on the banks of the Seine, and I remember the clothes washing which was to me one of the curious sights of Lyons. A hundred women, each with a basket of dirty linen beside her, were scattered along the banks of the river. Each woman had a basket to kneel in and a big, flat stone in front of her. She dipped her garment into the river and then laid it on the stone and rubbed it with a bar of soap the size of a brick. She then took a coarse, stiff brush and rubbed away at the cloth, until it seemed to me, she must tear it in pieces. She next rinsed it and then again covered it with soap, and again rinsed it. She now pounded the garment with a wooden mallet for about five minutes, then rinsed, brushed, soaked, and pounded again. Finally, after about ten minutes of such work, she called the garment clean, and spread it on the stones to dry. After she had completed her work, each washerwoman tumbled her dried clothes into a big basket and carried it off on the top of her head. I find that this head-carrying is done by the women in many parts of the world, and such women always have splendid forms. The washerwomen who carry burdens on their heads are as straight as an arrow. Their shoulders are broad, their necks well set, and they are never afflicted with spinal troubles.

The drying of clothes is one of the troubles of the cities of the world. In New York you see them hung on ropes, reaching from one window to the other, or on the tops of the houses. I know a woman, in the fashionable part of Washington, who has the garments of her family floating from

A SIAMESE BATHER.

the top of her fourth story every week; and, in Edinburgh you may see long sticks running out from the windows with a crosspiece nailed to their ends, and clotheslines tied to this and stretched from the crosspiece, parallel with the central stick, to the window. Upon these lines the clothes are hung to dry, and during parts of the week, as they drip down upon the pavement, you look up for rain but see only wet shirts and nightgowns.

Among the strange sights of Scotland is the washing. The girls there use their feet instead of their hands for getting the dirt out of heavy clothing. They tuck their cheap, bright-colored dresses up above the knee and in this way tread the dirt out. They are remarkably clean, and their method seems to be a successful one.

So far, in my travels about the world, I have found the washboard used nowhere except in the United States, and patent washing machines and clothes wringers seem to be practically unknown outside of America. In no country of the world are there so many labor-saving appliances for women as in America, and in no place is woman so well treated.

A District-School Society.

JESSIE STEBBINS.

The girls of our district school have organized a secret society for the purpose of correcting the habits of using slang, bad English, and careless

manners. And, as it has been a benefit to us, we would like to tell the readers about it. We have a constitution and by-laws; there are five officers, viz.: President, vice-president, secretary, lecturer, and guard. The vice-president is chairman of a committee which keeps an account of the slang and misused words, and each member is expected to keep a truthful account from one meeting to the next. For every ten slangy and misused words which a member uses she must learn an appropriate verse from the Bible to recite at the next meeting. The meetings are held every two weeks, and the member who has used the least slang, etc., and who has kept the rules the best becomes the president at the expiration of four weeks. At each meeting a programme is carried out which makes them interesting and instructive.

In the Pennsylvania Oil District.

MRS. M. C. SHOEMAKER.

A small section of country about Titusville, Pa., has played an important part in the commercial and economic history of our country; for it was here that the oil industry originated, and it is here that, to-day, the work of boring for and collecting rock-oil is carried on. Driving over one of the corduroy roads, that abound in this part of the country, hundreds of tall frame structures, on the surrounding hills, look, to unaccustomed eyes, very much like windmill pumps, only that the fan for the wind is wanting. Long wooden shafts are held above the ground by supports, resembling the impromptu tripods which hold the summer picnic kettle over the fire. The windmills, however, are oil derricks; the large, round, red boxes peeping out from clusters of trees everywhere are oil tanks; and the small iron pipes running near the roadside are for conveying the crude oil to refineries. On the day our party visited the oil works a new well was ready to be shot. A torch of natural gas burned beside the engine house. Between the latter and the framework of the derrick was a long, low shed covering the engine belt, and twenty-five feet above the floor of the derrick a rough roof for the protection of the workmen. The derrick supported ropes and pulleys connected with the engine, and this comprised the machinery which operated the "bits" and other tools used in boring a well. There were several "bits" of different weights which they had used at this well, the one for boring before rock was struck being the largest. They all resembled huge chisels, and when in use were constantly turned by means of a screw, so that the well should be perfectly round. The "bits" had gone down through two hundred and fifty feet of earth before striking the solid rock. They then labored through this until at about eight hundred feet they struck the oil-bearing sand rock.

The wells were so near each other that I remarked to one of our friends I thought some of them must descend to the same stream of oil.

"Oh," he said, "you do not exactly understand where the oil comes from. It is buried in the earth, not in streams or pools, but is held in the porous sandstone as water is held in a sponge. After the wells are "shot," the oil drains into the cavities which are made by the explosion, and is then pumped up into tanks. We oil men used to think just as you do, and we always bored wells near a stream of water thinking that the oil stream underneath followed the course of the water on the surface, but we know now that such is not the case, and we have just as many on the hilltops as in the valleys.

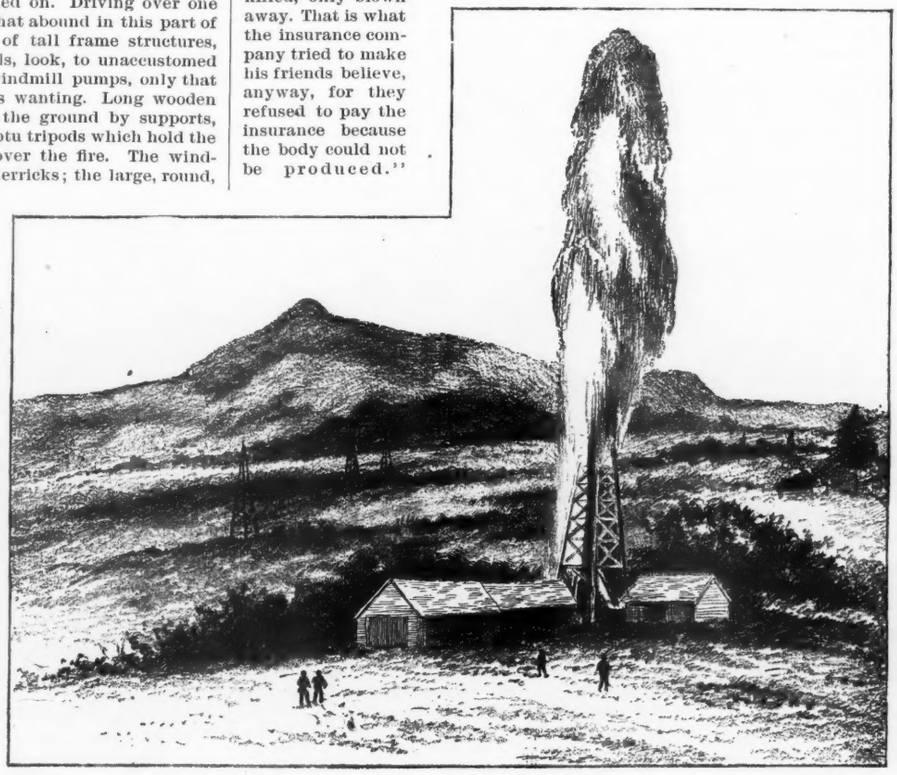
Just then our host came up and asked if we had noticed the men handling nitro-glycerine, so our attention was turned to that. From a small wagon, supported on strong, low wheels, and swung on the most elastic springs that can be made, a man lifted, from a bed of cotton, a square tin can and carefully carried it to the mouth of the well. He then slowly and cautiously poured the contents into a long tin tube, pointed at the lower end. After the tube was filled and covered, it was carefully lowered into the well by means of ropes and pulleys. This was repeated until three tubes, each holding nearly twenty-five quarts of nitro-glycerine, had been lowered. The last tube had for its covering a percussion cap. We were very glad to see the third tube disappear without an explosion. I asked if accidents did not occur sometimes to the men who drove the queer-looking wagons containing the dangerous explosive.

"Yes, indeed," was the reply, with a grave shake of the head.

"Why," broke in a small boy in the party, "last winter a man was blown up and they never could find anything of him but a little piece of his shirt."

I shivered and glanced nervously toward the well.

"Don't be afraid," laughed one of the older members of the group, "perhaps he was not killed, only blown away. That is what the insurance company tried to make his friends believe, anyway, for they refused to pay the insurance because the body could not be produced."



SHOOTING AN OIL WELL.

By this time the tin tubes in their low resting place, had been covered with about three hundred feet of water, the "bales" and the ropes, and the pulleys had been fastened back, the fire had been extinguished, the supports for the pipes fastened into the mouth of the well, and the workmen sang out, "We're ready." All of the company, except the owner of the well and myself, retired to a respectful distance while we stepped up to the floor of the derrick.

My friend handed me a curious, wedged-shaped piece of cast iron, weighing five or six pounds, and said, "Here is the 'go-devil.' Do you think you have the courage to drop it?"

"Is there danger?" I asked.

"No," he said, and smilingly handed it to me.

I held it over the mouth of the well, and he said, "I will tell you when to start away. You must not get confused, but go quickly to that clump of trees about fifty feet distant. Now let it drop."

My fingers relaxed their hold, and the "go-devil" sped down the well, giving fiendish taps on the iron piping, as if it exulted in its power over what it was hurrying to meet, eight hundred feet below us. We heard it splash into the water; then we quickly stepped off the derrick. In an instant there was a sound as of distant thunder, and the ground trembled. We ran hastily toward the clump of trees, but before we reached it the other portion of our party called out, "Stop, turn." We obeyed in time to see a column of water six inches in diameter starting out of the well. Up, up it went with a roaring, rushing sound until it fell into beautiful, sparkling sunlit spray one hundred feet above the surface of the ground. Mingled with the column and the spray were portions of rock and tin tubing which were shot up with such force that they knocked the heavy boards off of the derrick. In a few seconds yellow oil succeeded the fountain of water, and in a short time it, too, had subsided and all we could see coming from the well was a great volume of natural gas.

The Women's Colleges of our Country.

KATHARINE LEE BATES.

Fifty years, printing with their steady pace, now the snow and now the moss, here treading lightly upon violets, there rustling among fallen leaves—of what new gifts from heaven to earth have these been bearers? Many gifts and good. The one with which this article would deal is of the best, for while it is much to have increase of our possessions in the various realms of material comfort, mechanical appliance, scientific discovery, it is more to have increase of personal power whereby we may lay hold of these possessions and transmute them into character. Of what use is the drawing-room car to us if it carries us on no worthier errands than the old stage coach did, or the telephone, if we have not a nobler word to speak into it, or new sciences, if they work in us no deeper reverence for fact? Already is the cry shapen on our lips: "Enlarge not our boundaries alone. Enlarge ourselves." But how shall the race rise adequate to dealing with this ever-broadening life about it, if one-half of humanity is bound over to the petty and the false? For even the sweetest ministries of home are darkened if the wife and mother, however loving, however laborious, is ignorant, narrow in view, stunted in mental growth and morally bewildered by a nurture which has trained her to prize semblance rather than reality. Yet who, having watched the poor, brave, baffled efforts of many an ill-equipped, incompetent home-maker, puts the reproach on her? Every living organism is dependent upon food. From time immemorial the mothers of mankind have been starving for the intellectual bread and wine that should be to them at once sustenance and consecration. All blessing, then, upon the last half century, which has begun to recognize and satisfy this hunger!

The modern experiment of an equal education for the two sexes was first hazarded here in America. Although the early laws of Massachusetts had declared that "all children" were to be taught in the public schools, Boston, prior to 1825, furnished girls with instruction, and that of merely grammar grade, only in the summer months, when many of the boys were called away from their desks to out-of-door occupation. But in this memorable year an attempt was made to establish a high school for girls. To the dismay of the authorities, two hundred and eighty-six candidates at once presented themselves, whereas the high school for boys had never numbered over ninety members. Disconcerted by such preposterous success, the discreet town of Boston closed the school at the expiration of eighteen months, a

quarter of a century intervening before it was revived. But this much had been gained by the brief career of the girls' high school,—that thereafter girls were allowed in the lower schools all the year through.

The initiative in opening college education to American women was taken by the young and

FIG. 1. A BIRD AND BUTTERFLY DESIGN.

adventurous West. Oberlin, ever stanch to its sense of right, offered, from its foundation in 1833, equal advantages to women and to men. Thirty years later, the University of Wisconsin followed suit. By 1865, Vassar, destined to bear the brunt of newspaper ridicule, was in the field. Within the next five years, the State Universities of Kansas, California, and Michigan had declared themselves ready to admit women, and another five years witnessed the yielding of Wesleyan and Cornell, the opening of the co-educational Universities of Syracuse and Boston, and the founding of Smith and Wellesley. By 1879 the Harvard Annex was in operation, and by 1885 Bryn Mawr had donned her cap and gown.

How shall girls make selection among these various colleges? Setting aside questions of locality and cost, first of all comes the choice between co-educational institutions and the colleges for women only. It may seem a paradox, but excess of emotional life, at the expense of the intellectual, has shown itself a peril more likely to invade the latter than the former. Yet granting that the co-educational university is called to be the university of the future, the Vassars and the Princetons alike going down before it, nevertheless, so long as the Princetons still stand firm, the

FIG. 2. CHINA WITH BANDS OF GOLD.

Vassars are but at the beginning of their task. "Be worthy love and love will come," sings the poet to the child. "Be worthy truth and truth will come," might be the watchword of woman's educational progress. The men's colleges, that value the hard won learning of the past so highly they will not share it with women lest it be wasted and degraded, are forgiven even in the act. But once let women clearly show that they can not only appreciate and appropriate this treasure, but have power to augment it or, better still, transform it into nobler expression, and then what hinge so rusty that it will not yield?

To choose aright among the women's colleges, it is necessary to take note of the peculiar features of each. Life at Vassar is on the dormitory plan, her faculty is composed of men and women, her roll of students is at present shorter than that of Smith or Wellesley, but hers is the honor of the pioneer, and hers the record of genuine contributions to the stock of human knowledge. Smith was wise in establishing cottage life (cottages being in college parlance buildings capable of accommodating from ten to fifty people) and Smith is fortunate, moreover, in having the city of Northampton as a reserve receptacle for the overflow from her campus, the college being in this way practically unlimited as to numbers. Her graduates are in high repute among college women for their mental alertness, enterprise, and *esprit de corps*. Wellesley portions out her seven hundred students among one large, central building, a secondary hall, six cottages, and selected homes in Wellesley village and vicinity. Her president is a woman, her professorial chairs, with one exception, are filled by women, and her long list of instructors counts but few men upon it, although the schools of music and of art are under masculine direction. Beauty of natural situation, artistic embellishment, a liberally endowed library and elaborate scientific apparatus have done much to attract students to this college, where it was the eager wish of the founder that the æsthetic and religious faculties should be quickened, together with the love of sound and generous learning. Bryn Mawr is unique in various respects, such as the adoption of an academic dress, the introduction of so large a proportion of European instructors and European methods, and the establishment of a group system of studies, analogous to that of Johns Hopkins. Of Wells, of Elmira, of Ingham, of Rutgers, of the Harvard Annex and the Columbia Annex there is not space to speak, and Mount Holyoke, welcome as this, which was originally the most progressive of seminaries, is to the collegiate ranks, has not as yet had time to reveal its tendencies.

The tide still rises. Every year brings new conquests. Secondary schools multiply. Seminaries reach out toward broader ideals of culture. At present the number of women graduates from American colleges amounts to nearly forty

FIG. 3. A DESIGN IN SEPIA.

thousand, though scarcely a tenth of these hold degrees from courses truly collegiate. The select four thousand, however, of whom nearly a third are enrolled on the lists of the National Association of Collegiate Alumnæ, already a recognized force in educational affairs, represent institutions whose requirements for admission, scope of curriculum and standards of instruction and scholarship clearly entitle them, by American measurements, to collegiate rank.

Nor is this all. Our learned professions, pre-eminently medicine, are making room for women, some of our leading colleges are largely officered by women, and the outlook for the future is bright with promise. The stubborn doors of Harvard, Yale, Johns Hopkins, creak and tremble. Fellowships for women are offered by Bryn Mawr, Cornell, Wesleyan, the University of Wisconsin, and the Massachusetts Institute of Technology. Even Harvard counts a woman among its Fellows. The Association of Collegiate Alumnæ has founded a European followship, for here, in the line of

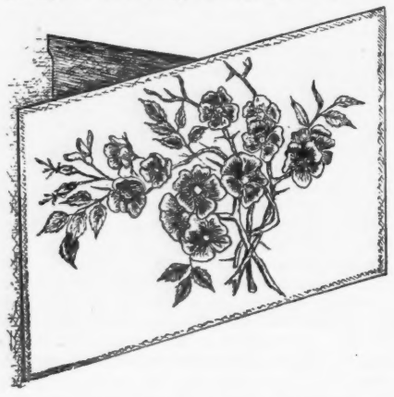


FIG. 4. CLUSTER OF WILD ROSES.

followships, admitting of advanced and specialized study, lies the crying need of the hour.

Another sign of hopeful augury is the earnestness with which physical culture is being preached and practiced in girls' school and women's college, yielding basis for the joyful expectation that the next half century will begin to reap the harvest that the last half century has sown—a harvest of women, sound of body and of mind, frank and free and capable, beautiful in face and soul, paying back in original achievement some fraction of their debt to the man-accumulated learning of the

FIG. 5. DESIGN IN GREEN.

past, and recompensing society for its educational venture in their behalf by a richer and more symmetric womanhood than the world has ever known.

The Art of China Painting.

ANNA HINRICHS.

True porcelain is pure white, very hard, translucent, and almost infusible. While the Chinese and Japanese have manufactured excellent porcelain from time immemorial, it was not till 1709 that this most exquisite material was first produced in Europe. It was in the transition period from alchemy to chemistry. Experts in the chemical knowledge of that time were still holding it possible to convert baser materials into gold by chemical operations, involving the action of high temperature, for a long time. When having a semblance of success, these men were called

FIG. 6. BLUE AND GOLD.

adepts. They were maintained by princes, and furnished with all the means of experimentation they desired, but kept under rigid guard, so that their work, if successful, would be of benefit to no one else. At the very beginning of the eighteenth century, John Frederick Boettcher was considered an adept in Berlin. When Frederick I. tried to capture him, he managed to reach Saxony, where August II., of Poland and Saxony, put him under close guard, on the fortress of Königstein, to make gold. The numerous experiments of Boettcher, mainly undertaken with a view of getting crucibles that would stand the highest degree of heat for a long time, finally resulted in his discovery of the making of genuine porcelain. Immediately, a large factory was established at Meissen, which to this day has remained foremost in the ranks of this art.

For table use no material can compare with genuine porcelain. Its finest pieces are costly as gold, but are not corroded chemically, nor injured mechanically by knife and fork, remaining perfect through generations, although in constant use. Painting on this matchless material is one of the most beautiful of arts, and one that may be cultivated to a high degree. Any one is able to "decorate" china with imported transfer pictures. Such work looks very well; that must be admitted,

but imitation is never truly beautiful, and certainly does not tend to elevate art in any sense. China painting demands some natural talent for drawing. Indeed, for any art work, drawing is the best foundation. Cultivate a correct taste, through study of the finest models, and unconsciously the eye is trained to perceive rare things in art and nature, and the hand acquires the power to transcribe these impressions.

The liberty of choice enjoyed in mixing oil and water-colors is impossible in china painting. The chemical changes wrought through the final pro-

FIG. 7. A BORDER IN BROWN.

cess of firing prohibit mixtures that are harmless in either oil or water-color painting. Naturally, the difficulties of indiscriminate mixing would involve a greater assortment of colors. But it is better to employ a limited palette, understand its full capacity before increasing, study effects and deportment of colors when acted upon by the fire.

It is of primary importance to know to what extent iron is present in the composition of colors.

1. The whites, blues, and gold colors contain *no* iron.

2. The yellows and greens contain but *little* iron.

3. The reds, flesh tints, red browns, and iron violets; the browns, brown yellows, ochres, blacks, and most greys, contain iron *as a base.*

If painting from copy, one in water-color is best adapted for reproduction on china. As in all arts, it is advised to work from life or nature. Nothing affords better subjects for china painting than the floral realm. Fruits are also good. Always arrange flowers in a careless, graceful manner, devoid of any artificial stiffness. In painting petals, the strokes of the brush are made from the circumference toward the center of the flower, and in foliage from the prominent vein out to the edge. Parallel veined leaves and grasses are painted with strokes from the apex to the base.

The surface of the china serves as the local tint in painting white flowers. In the shadows always aim to attain transparency, which is best taught and learned through experience. The shadows are effected with yellow and gray, or a gray made of black with a trifle of blue. High lights are touched with permanent or Chinese white.

Yellow centers of flowers are painted with mixing yellow, shaded with brown green, or heightened with jonquil or orange yellow. Before painting the center, scrape away any underlying tint, so that the yellow is applied directly to the surface of the china. Yellow flowers are painted with mixing or jonquil yellow, shaded with brown green, and tinted with iron violet. Pink flowers are produced with carmine, and the proper shading with a gray, made of carmine and apple green. Dark crimson is made with deep purple, shaded with the same. Red flowers appear through the use of capucine red, orange red, deep red brown, or flesh red. For the shading add black, brown, or iron violet, as may be wished. Blue flowers are effected with any of the blues to correspond to the tint desired, some pale shades requiring the addition of carmine. Shade with black or black gray. Dark purple flowers are made with deep purple, golden violet, and deep blue, the latter being added in a greater or less proportion, dependent upon whether the color is to be more purple or crimson. Deep blue is used for shading. Grass and leaves are painted with grass green; blue added for bluish green, and mixing yellow for yellow green. The most brilliant green is produced with jonquil yellow. For extreme dark shadows use black green, but cautiously, for it is a color of great intensity. Grayish shadows are effected upon the addition of carmine and purple. For touches of brown and red, use dark brown and iron violet.

Butterfly, bird, and bee are a pleasing adjunct to floral designs. Black markings and veinings of wings are produced with ivory black. Fill the intermediate spaces with varying proper colors. Sepia is the correct color for brown, and mixing yellow for the yellow. Shade with brown green. Fig. 1 suggests these pretty creatures in natural poses.

Gold is an effective element in china painting. It comes in the form of a powder, a liquid, and a paste, for relief work. As full directions accompany these preparations, it is needless to dwell further upon them. Never lay gold and colors one over the other, neither must their edges be allowed to impinge; either would be disastrous in firing. Gold is put on as a band, a Greek fret, or an artistically irregular dabble.

Nothing exceeds the elegant simplicity of the finest of china, ornamented with gold. Fig. 2 illustrates parts of a tea or breakfast service after this idea—a conception in white and gold. The china must be flawless, clear, and of the highest lustre. Its sole decoration consists of fine linings of gold down the entire surface, with a finish of deep bands of gold. Cups, saucers, and plates are decorated in a like manner.

Dinner sets decorated with monogram in gold are in high favor. The monogram must be exactly in the center of the space to be ornamented. Old English letters are best. They require precise drawing, and must be taken from an authentic alphabet. Before attempting a full set, it is advisable to experiment on a plaque or a plate, a flat surface being more easily treated than a round.

Fig. 3 pictures an *en camaieu* design in sepia. Any one able to draw can reproduce this design on a porcelain plaque, for it is simply etching. In colors, an idea easily executed is that of a cluster of wild roses, as shown in Fig. 4. If patience, time, or means are lacking for the painting of a full service, individual cups and saucers, fruit and nut plates can be creditably decorated by any one at all skilled with brush and palette. Indeed, it will prove more satisfactory in the end to practice considerably in this way before attempting an entire set.

The possibilities of a single color in deepening tones are vividly set forth in Fig. 5, which presents a unique Chinese inspiration in green. A composition in gold, with brown shading, is equally effective for an individual platter. It is in imitation of miniature cornstalks or bunches of

FIG. 8. CHRYSANTHEMUM DESIGN.

grain, that have seemingly fallen upon the corner of the plate.

A bit of harmony in blue and gold is represented in Fig. 6. The plates are tinted a celestial blue, and ornamented with a conventionalized floral piece, or a geometric design. All lines are defined in gold relief. A pleasing border in browns, for a set of plates, is suggested in Fig. 7. The edges are finished with a narrow gold band.

The "French sprig" is the most dainty and simple of decorations for a tea service. It consists of forget-me-nots and golden sprigs, in relief, loosely interlaced over the entire surface; finish with blue or gold band. Another fancy for a set is that of daisies or roses, outlined with raised gold. Tint a delicate blue, paint large white daisies finally border each flower and petal with gold paste; burnish, and finish with a fine gold edge. A fruit set, decorated with clusters of strawberries, fully and partially ripe, mingled with its snowy blossoms, is an excellent subject for a beginner. Fig. 8 shows pieces of a chrysanthemum coffee set. The ground is laid a rich cream, the blossoms painted in carrot red, with foliage in brown green.

After all this fascinating artistic work comes the really critical point—the firing. This decides the success or failure of the undertaking. The firing may be done by the amateur with "china kilns," heated with gas or gasoline, or "mufflers," operated with coal. These are excellent, but it is more reliable, and not expensive, to have the firing done by a professional—at least until some experience has been acquired.

It is generally believed that two to three firings are indispensable for work embracing various colors. There are certain elaborate effects that can only be produced by two or more firings, but one firing answers all practical purposes. The beginner and careless artist may require a firing for the tinted ground, another upon the painting of the design, and a third for the application of the gold. With careful workers this is superficial. The point is to have the colors of exactly the proper consistency, and as dry as possible, avoiding an excess of fat oil; that the different colors are not allowed to impinge, and that all the colors are perfectly dry before another wash is applied. If the painting should not have received a satisfactory degree of glaze in the firing, the deficiency may be restored by applying a light wash of one of the more fusible colors, in which case another firing is required.

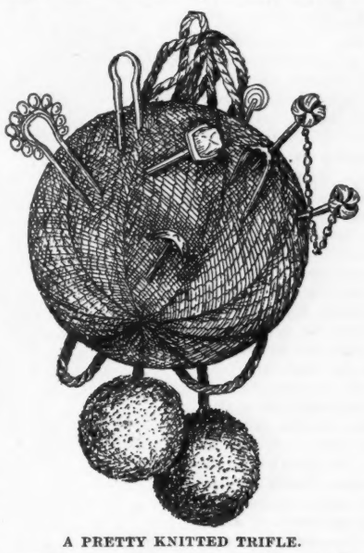
Duster Bags.

ALICE CHITTENDEN.

A set of bags in which to keep dusters is a most practical gift for the housewife. Choose pretty cretonne for the bedrooms and kitchen, and silkoline for the parlor and dining-room. A yard of material a yard wide will make two bags. Take a piece thirty-six inches long and eighteen wide, sew it up and fold so as to have the seam in front, leaving about ten inches from the bottom, an opening large enough to put your hand through. You may point both ends or leave them square, or make some one way and some another. Trim the cretonne bags with flax fringe in colors to match, and the silkoline bags with a tassel fringe or with the crescents, coins or bells used for fancy work. Take a brass or wooden ring such as is used for curtain poles and draw the upper end of the bag through about ten inches. Hang it up by this. If you know the colors of the furnishings in your friend's room, see that your bags harmonize. For a young lady's room one made of white butcher's linen with "Duster" worked on it in quaint letters, or "Get up and dust," or a spider's web done in yellow linen floss would be suitable.

An Orange Toilet Cushion.

This unique toilet cushion is a large knitted ball in bright orange colored zephyr. To knit one, take two steel knitting needles rather larger round than the zephyr and cast on thirty stitches. Knit across plain, *turn, knit all but the last seven stitches, turn, pass the wool back on the other side and knit back the other way till there are only seven left on that end; turn again as before and knit all but six; go on in this way leaving only five at each end, then only four, then three, then two, then one, then knit all, then once across plain;* this completes one of the nine sections of the orange. Repeat from star to star eight times. Bind off very loosely when the ninth is finished, sew the two edges together (loosely but still closely), draw one end up closely and turn the



A PRETTY KNITTED TRIFLE.

ball. Fill it with curled hair, as full as it can be filled and not be hard, and sew up the other end.

Take zephyr, shaded from deepest orange to lightest golden yellow, and twist a heavy cord a yard long, and tip the ends with full, soft ball tassels. Sew the middle of the cord to one end of the orange and tie the cords in a bow about two inches from the ball—thus forming a short loop by which to suspend the orange. It makes an odd and brilliant ornament for the dressing-case and relieves the "regulation pin cushion" of all ornamental bonnet, hair, and stick-pins.

BOYS & GIRLS

A Foolish Quarrel.

FANNY M. JOHNSON.

One late October day, fully a hundred years ago, two large ox teams stopped at a point where the highway forked in two rough cart tracks, one running up the right, the other the left side of Spur hill. The ox wagons were laden with household goods and farming tools, and the oxen were driven by two men whose close resemblance to each other showed that they were brothers. Behind each team walked a boy leading a cow, and rode a woman on horseback, each of the women having a small child on the horse in front and a larger one on the pillion behind her. On one of the ox wagons, sitting straight and secure on a rather lofty perch, was a rosy-cheeked girl of twelve or thirteen. The little, newly-settled town of Gratton lay three miles behind the traveling company. They had passed through the village in the mid-afternoon, but the ox teams had moved very slowly, and the day darkened early. It was almost dusk when they reached the fork of Spur hill. The foremost man stopped his team and went back to speak to the other. "Brother," said he, "we might as well make camp one night more. Here's a good open space before us, the night's mild, and there's dry firewood hereabout, plenty." "We're pretty near through, now," suggested the other. "It's a good mile further," replied John Forbush, the first speaker. "The critters are tired, and so are the women and children. 'Twould be pitch dark before we could get through, and we'd be full as comfortable here for the night, after all." "Well, mebbe it's the best way," consented Ben Forbush, the younger brother. The tired oxen were released from the cart and, along with the cows, were soon munching hay in a little rope yard, improvised in the shelter of the bluff. John and Ben Forbush began driving the stakes for their tent, and their wives took from the wagons the few household utensils and the provisions wanted for supper. John and Ben, junior, took their axes and started up over the front of the spur to cut a supply of wood for the night's camp fire.

Though the elder John and Ben Forbush were so much alike that strangers could scarcely tell them apart, there was not much resemblance between their eldest sons. Young Ben was slim and wiry, with nervous black eyes and quick motion like his mother; and young John closely resembled his own mother, who was a tall, fair blonde, of quiet speech and deliberate manner. John was rather overgrown for his years, and though two months younger than his cousin Ben, was fully half a head taller. The lads had been close companions since their babyhood, and were attached to each other, boy fashion, but their differing temperaments and dispositions often clashed, though they seldom came to an open quarrel.

Both were tired after their long day's journey, and both felt cross and hungry. John walked ahead, swinging his axe in an aimless fashion, while Ben, with his axe over his shoulder, scrambled along up the hill after his taller and stouter cousin.

"Don't go so fast, John," he panted, as they reached the top of a bluff where a lot of dead pine boughs, scattered about, showed a good supply of kindling ready to the hand.

"What?" exclaimed John, turning suddenly about. Ben was nearer to him than he supposed, and his axe swinging backward, the helve hit Ben smartly on the shin. Ben gave an exclamation of pain.

John was sorry, and was on the point of saying so, but Ben gave him no chance.

"You great blunderheels!" he exclaimed hotly, rubbing his bruised leg. "Can't you look and see what you are doing? Slashing your axe around that way! If the blade had been turned this way, you'd have cut my leg half off."

John's expression of sympathy was checked on his lips.

"Pooh!" he exclaimed, coolly, "you know I didn't mean to. What's the use of making such a fuss over a little thing like that? You're a regular chicken."

"And you're a great clumsy calf," retorted Ben. "My mother says you never know what to do with your hands and feet, and you don't. I'm glad I ain't such an awkward, overgrown fellow." The blood flushed up hotly into John's blonde face. He was just at the age to feel keenly any reference to his growth and awkwardness. The truth was that Ben, and Ben's mother, too, really admired John's straight, strong figure and strength of limb, but John did not suspect it. "You little rat!" he retorted, frowning angrily at Ben. "I've a good mind to fling you off of the bluff here." The boys had halted near the edge of a cliff, pitching down abruptly to a rocky hollow where some long-ago convulsion of nature had rent a chasm in the hill. Beyond and above them reached the forest covering the face of Spur hill, the slopes of which, never yet the home of a white man, were to be their inheritance. Clouds drifted over the silent woods, and their depths looked dim and dense in the gathering shadows. They were on the borders of a new home, the entrance to a new life which must be one of hard work, self-restraint and mutual help; and they were facing each other angrily in the folly of a boyish quarrel. Ben was far the angrier of the two. His wrath made him forget his fatigue, and nerved him with a furious strength which made him feel as if he might punish his big cousin. "Try it, if you want to!" he cried. "I dare you to touch me. I'll make you sorry for it, big as you are." John really did not want to fight. Not that he was afraid of Ben, but the occasion was too trivial. Besides, they had more important business in hand. "Fudge!" he exclaimed, after a moment's pause. "Don't be foolish, Ben! Come along and get the wood before it is any later." John's coolness exasperated Ben to greater anger. With a sudden movement he threw himself upon his cousin, and by a wrestling trick known to both of the boys, but which took John by surprise, threw him from his feet, and they rolled together on the ground.

Now, John was thoroughly angry in his turn. Ben rained a shower of blows upon his head and face before John could throw him off and strike

"CAN YOU HOLD ON, JACK?" ASKED BEN.

back. Then John's strength of arm began to give him the advantage, and the blows were returned with heavy interest. Striking and struggling, neither one able to gain his feet while the other was clutching him, the foolish boys rolled gradually nearer and nearer to the cliff's edge, too full of fury to realize where they were moving.

It was not long an equal contest. John was soon uppermost again, and pinning Ben to the ground, he demanded wrathfully:

"Will you give it up now?"

"No, I won't!" cried Ben. "You haven't beaten me yet, and you ain't going to," and he struck John a violent blow in the nose.

Then the struggle began again, and with every desperate movement the short space between them and the precipice narrowed.

The ground was slightly sloping here, and in Ben's last frantic effort to reverse their positions, while his arms were tightly grappled about John's waist, suddenly the boys felt the solid ground roll away beneath them and realized that they were falling.

Sixty feet below them yawned a chasm of jagged rocks. Bushes and shrubs grew out from the cliff's side, but they were insufficient to greatly break the force of a fall down the steep incline.

Fortunately, an oak bough of stout growth, springing from between the ledges near the top of the cliff from which it grew out almost horizontally, was within John's reach, in the horrible moment when he felt himself rolling over the brink. He clasped his arms around it and checked the fall. Ben, too, with one arm still clasped about John's waist, gained a hold of the bough with one hand, and so, dangling over the precipice from this slight support, the boys hung, their anger suddenly cooled, the faces which had been red with rage now white with fear.

And while they hung there the boys knew, all at once, that they loved each other, that they did not want to hurt each other, and that the world would be a lonely and sorrowful place for either, if his lifelong comrade and playmate were not in it.

"Can you hold on, Jack?" asked Ben, whose chin just rested on John's shoulder, and who was hanging with nearly his whole weight depending on one slender arm.

"I guess so," said John. "Get a good grip on my belt, Ben. Perhaps we can make the folks hear if we shout together.

Their voices rose in a loud, long cry for help, which it seemed to the boys might be heard for miles. Then they listened and waited.

A great bird skimmed overhead, and a scared squirrel ran along the oak limb and scuttled away into the darkening wood; and then all was still.

The boys called again and again. The strain on their arms was growing very painful, and it seemed impossible to hold on many minutes more.

There was no answering voice and no sound but the rattling of pebbles, dislodged by the shaking of the oak bough and sliding down the rocky cliff.

"They can't hear us," groaned Ben. "We're too high up. And we never can hold on until they miss us and come to look us up."

"Ben, look along the rock and see if there is any place that I can reach to get a rest for my heels without letting go of the tree."

As the boys had rolled over the edge of the cliff, John's back was toward the rock and Ben was facing it. Looking along the rough surface, Ben saw a short bit of the ledge which projected a few inches from the face of the rock in its widest part.

"Edge backward a little if you can, John," he directed. "Draw your arm up a little higher and move your right foot up about a hand's breadth against the rock. If you can get your heels on that ledge, and keep tight hold of the tree, I believe I can climb up over you and then help pull you up." John cautiously made the effort. Moving backward inch by inch, while Ben clung firmly to the leather belt about his waist, he succeeded in finding a lodging for his heels. To do this, he had to release one hand from its hold on the tree and cling with the other, while with the free hand he helped to steady Ben as he loosened his hold on the bough and, clutching John's waist and shoulders, tried to climb upward.

Now, it was fortunate, indeed, that John was strong and muscular, that Ben was light and nimble and wiry. It was a perilous moment for both, while, nerved by the terrible danger below and clinging with a desperate grip to John's clothing, Ben raised himself until his knee rested on John's shoulders and his hands grasped the edge of the cliff. The oak shrub now helped him to a firmer hold, and soon he had reached the solid ground above.

Then hastily slipping off his stout homespun frock, Ben knotted a sleeve firmly around the oak bough and guided the garment within the reach of John's hand. Using this to steady himself, John carefully drew one foot upward along the ledge until he found a crevice in which his heel could rest. Luckily, the cliff here sloped backward toward the top. His foothold was a narrow one, but it supported him, and slowly John's stout shoulders came shoving upward over the top of the cliff. Now he could find a support for his knee on the oak limb, and now Ben, lying braced on the cliff above, could reach his hands and help him in the final stout struggle. In a minute more he was standing beside Ben on the cliff and looking down with a thrill of terror over the precipice to the threatening rocks they had both escaped.

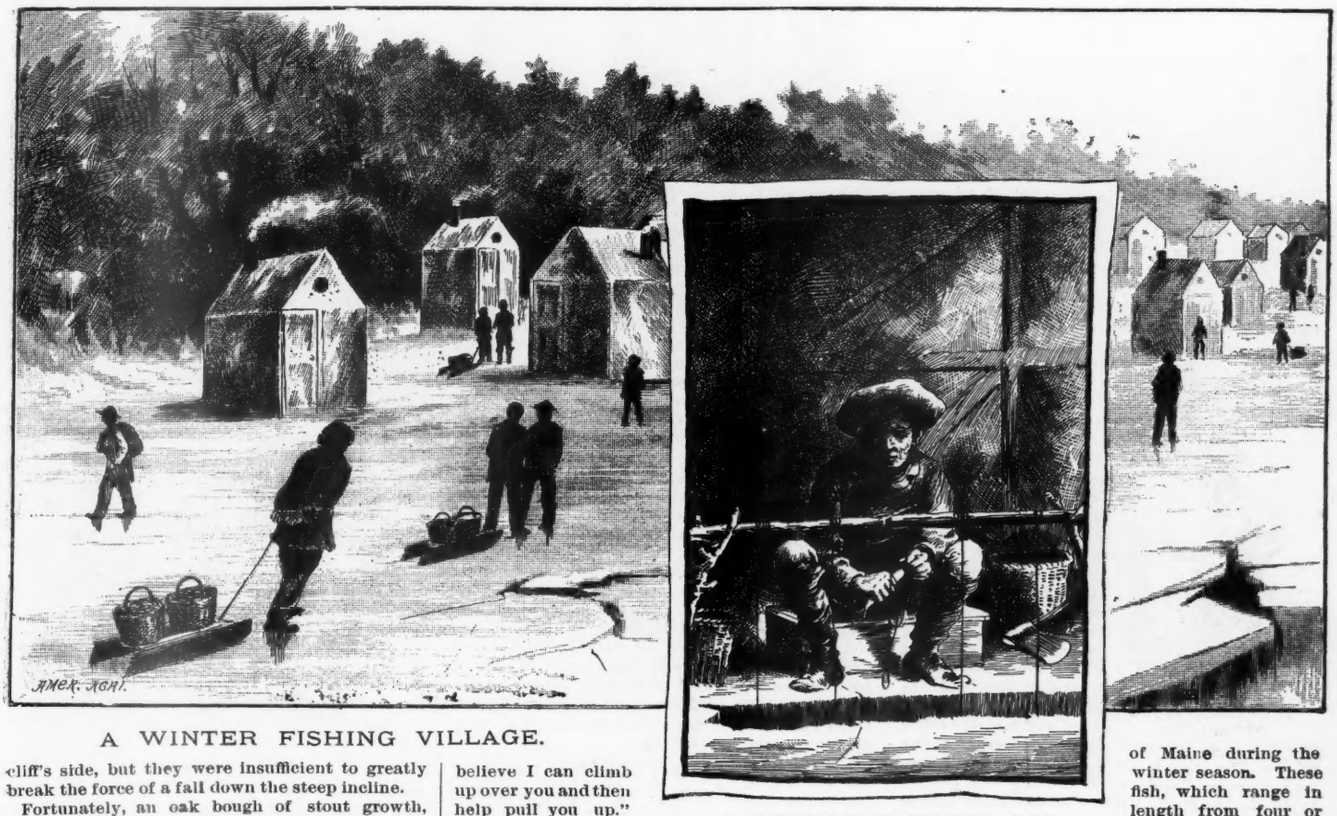
Half way down the hill, as they came in sight of the camp below with the newly-kindled fires twinkling up through the darkness, Ben stopped.

"Jack! I was a fool to pick a quarrel with you," he exclaimed.

"And I'm sorry I hit you, Ben," returned John. "I didn't mean to."

"I'll never fight you again," he added, "if I live to be a hundred."

And that was, indeed, their last quarrel.



A WINTER FISHING VILLAGE.

A YOUNG FISHERMAN.

Smelt Fishing in Maine.

WEBB DONNELL.

The catching of the small fish, known as the smelt, is a very important industry in some parts of Maine during the winter season. These fish, which range in length from four or five to eleven inches, come up into the rivers in immense quantities when the weather becomes cold, seeking the head waters, or the lakes that feed the rivers, as spawning ground. They were formerly caught in great quantities in weirs, but are now caught almost wholly with hook and line, or more correctly with hooks and line, since one line may have a number of hooks attached. In the spring, when these fish are passing down the rivers again to the sea, they are taken, to a limited extent, in dip nets at night. It is a very interesting sight to see these fishermen standing on some projecting point, rock or log, "sweeping the lazy brine" with their long-handled nets, while the picturesque shores are lighted up by frequent bonfires.

As soon as the ice begins to make along the shores and shallow spots in the late fall, or early winter, the small white houses begin to migrate riverward, borne on wagons, "for'ard" wheels or sleds, according to the condition of the traveling. These little houses are usually made of inch framing, and covered with cotton cloth, and this is sometimes oiled to make it waterproof. They vary in size, but rarely have a width or length of more than five or six feet. They are made without floors, the surface of the ice serving for this purpose instead of boards. A tiny stove occupies

one side or corner, which, with an old soap box for the fisherman to sit on, constitutes the sole furniture. A long slit is cut in the ice within each of these houses, and above it is placed, lengthwise, a pole supported either by the framing at the side of the house, or by crotched sticks inserted in the ice at the ends of the slit. From this pole are suspended a half dozen or more lines and, when the fish are biting well, a man has to work rapidly to keep his lines clear. Fifty or more pounds are sometimes caught in one of these little houses in a day. Each night the day's catch is packed in boxes and allowed to freeze, and is then shipped to Boston or New York to be sold by commission merchants.

The flavor of these Northern smelts is vastly superior to those taken in lower latitudes, and this creates a lively demand for all that can be taken during the season. The price in the local markets here usually opens at about ten cents per pound, but soon falls to six cents, which represents, probably, the average price received when the fish are shipped away.

With the Silver Beaters.

S. JENNIE SMITH.

Happening one day last summer to drive through Hicksville, a little village on Long Island, I heard a queer, beating sound, which seemed to proceed from no place in particular. I inquired whence it came and was informed that the sound was made by silver beaters who were working "in a white house around the corner." I was surprised to find they could be heard so far away, and, as my curiosity was now aroused, asked if we would be allowed to call on them. This question led to my spending a pleasant and profitable hour with the silver beaters. I learned that the business had formerly been conducted by a Mr. Brown, now deceased. His wife had been an able assistant, and at his death had taken charge, proving herself an eminently successful business woman. From Mrs. Brown I gathered the following interesting facts.

To begin with, the silver foil is bought in long ribbons. These are cut into small pieces, two and a half inches square, two hundred and fifty of the squares weighing two ounces troy weight. The pieces are then handed to girls who are seated at a table which is made very much like the steps of a stile. The first step or shelf is about the height of an ordinary table, and is one foot wide; the second, six inches higher and six inches wide, while the third and last one is six inches higher yet, and wider than either of the others. The table is arranged in the same way for both sides, the upper shelf being wide enough to do double duty. On the second shelf on the left-hand side was a row of piles of skins, each pile containing two hundred and fifty-one. These skins are imported from Germany, are five and a half inches square, and cost from $4.50 to $5.00 per thousand, that number constituting what is technically called a mold; they can be used about five years. A hare's foot was lying in some floury-looking substance, and we were informed that the substance was prepared on purpose for rubbing on new skins before they are used. It is gypsum which is slowly made red hot in a furnace, and then allowed to cool, after which it is ground to a fine powder and then sifted. It resembles flour, but the trade name is "brime." As they had already gone through this operation they proceeded to the next, which they called "blowing-off."

THE RIBBON AFTER ANNEALING.

Lying upon a table built along the wall were some small racks which looked like oblong picture frames with a crosspiece. The men each took a pile of skins and held it up on one side on the racks; then, bending over, began blowing through the skins, manipulating them with both hands, the brime meanwhile passing down through the rack and up again, enveloping their faces with a white cloud. After about five minutes of hard blowing, they stood erect with large drops of perspiration rolling down their faces, which were red with the exertion—where they were not white with brime. In answer to my question as to whether a machine could not be used for that work, the lady stated that several had been tried, but they dried the skins too much, and could not be used. When a person is blowing, his breath keeps the skins moist. "Neither must we have them too damp," said she, and we were shown some piles of skins pressed in small iron presses which had been heated. "If through wet weather or any other cause they get too damp, we treat them this way." After the skins have been made ready for use, they are placed in piles on one side of the table

SILVER BEATERS AT WORK.

already described. Here is a pile of silver foil also. It is the work of the girl at this table to place a piece of the silver foil on, and in the middle of each piece of skin, until she has a pile containing two hundred and fifty pieces of foil, and two hundred and fifty-one skins. Her tools are a pair of long wooden pincers, padded at the portion resting in the hand, and a smooth, flat stick called a stop-stick. The silver leaf is never touched by the hands. Taking the pincers in the right hand, and the stop-stick in the left, with the pincers she quickly places a skin in front of her on the table, and then holds it in position with the stop-stick while the pincers go for and return with a piece of foil. And so it continues, the pincers placing and the stop-stick holding in place, until one pile out of the row in front of her has been finished, when it is ready for the next operation. Now, old parchment is necessary. This is brought from England at $2.00 per pound. Some of these pieces of parchment are dated one hundred and seventy-five, and others over two hundred, years ago, many of them having scrolls, birds, and cupids beautifully penned on the headings. One of the men handed us a small piece which he asked us to read. At first glance it appeared to be lettered in old mediæval style, but on closer inspection we found that it was not, and that no matter in what position we held it, it still had an upside-down appearance. He said that he had shown it to a large number of persons, none of whom had been able to explain its meaning.

The parchment is cut into strips the width of the skins, but long enough to wrap around once and paste down over the pack. Each pile of skins is slipped into two wrappers in such a way as to entirely envelop it, so that there is no possible chance of the skins slipping, or the silver foil getting out of place during the beating. This beating is accomplished with an eight-pound hammer, wielded, of course, by men, and on the top of a granite stone one foot square. This stone is high enough for a man to work at, standing. As there was a row of these in the front of the room, and a man beating on each, we wondered that it did not shake the floor. Then we noticed that the stones did not rest on the floor but were standing in holes, with their bases imbedded in the cellar. After the foil has been beaten until it is the same size as the skins, the parchment wrappers are removed, and the pile is handed to a girl seated at the table mentioned. Armed with pincers, stop-stick, and a very sharp, double-edged knife, she soon has the skins and silver leaves separated, and the leaves cut into quarters, after which they are passed to a girl who puts skins and silver foil together again. Then they are sent back, like the naughty little boy at school, for another beating. This operation is repeated four times, the last two beatings being done with an eighteen-pound hammer. Finally, when the leaf is ready to be trimmed and placed in the books, it is only one-sixteenth of the first piece of foil, which was two and a half inches square, and is now about four inches square. It would take one thousand of these, before the edges are trimmed, to make a silver dollar.

They are now handed to girls who are seated at a long table arranged like the first one described, with the exception that this is boxed in around the legs, so that every particle of the trimmings may be saved. These are melted down and sold at $1.05 per ounce. The first shelf of this table is covered with a soft leather, and the tools used are a stop-stick, pincers, and a wagon. This wagon is made of steel and looks very much like two chopping knives, perfectly straight across the edges, and when joined together by the handle, form two opposite sides of a square. With a paper book open on the second shelf in front of her, a pile of skins containing the silver leaf at her left hand, her pincers in her right hand and her wagon in her left, her stop-stick handy by, she is ready for work. Very deftly she lays aside the top skin and places the first leaf in front of her, when down comes her left hand and the wagon has descended, cutting two sides even. With a very slight blow the trimmings are blown through the space between the first and second shelf and fall into the box below. Then the wagon is raised and brought down on the other two sides, the trimmings blown away, the leaf seized by the pincers and placed in the open book. The page is then turned over ready for the next leaf, and so on until the book of twenty-five leaves is full. Twenty of these books, or five hundred sheets, are sold for $1.35. Sometimes, when the leaf is raised to put in the book, a small corner or perhaps a tiny piece out of the center is left on the table. Taking a piece from those lying around, the girl puts it over the torn place with the pincers and presses it down with the stop-stick, when it adheres and the place is neatly patched. The girls receive one-half a cent for filling each book, and can make from $1.00 to $1.50 per day.

All the trimmings are gathered up and placed in crucibles, which are put in a furnace until the silver melts. Then the crucibles are taken out and set aside until cool, when they are broken and the silver removed. The crucibles are made from a peculiar clay. They are kilned and are of various

GIRLS BOOKING SILVER.

shapes and sizes. The floor sweepings are saved and sold, as small particles of the silver will fall around, in spite of all the care.

The silver leaf is used for gilding frames, cornices, etc., it being much cheaper and more easily put on than gold. They have a kind of varnish, which they apply over the silver, and this gives it the appearance of gold.

A Few Words for the Boys.

CHARLES T. FORAN.

When you harness a team see if the collar is free from dirt and hair, and be sure it fits properly. Always speak to a horse when you approach him, especially from behind.

If, when afield with a machine, you take tools out of the tool box always leave what you do not want in the box. Don't place them on the ground where you are liable to forget and lose them.

If you wish to be educated you must go to school, and if you want to make a good farmer you must study the books and papers devoted to farming. Beware of the habit of forgetting what you read. It isn't what a man bolts down, but what he digests that makes him strong, and it isn't what you hastily skim over but what you thoroughly assimilate mentally that will make you wise.

If your older acquaintances smoke, chew, swear

and gamble, don't take their opinions as standard authority on such matters. Ask your father about it. He knows more than you, and is more interested in your future than they.

Boys, remember the foundations of a building are more important than any part of the superstructure. Farmers are the foundations of society, the most useful and most responsible part of it.

What a Boy Can Make at Home.

HENRY D. TAYLOR.

"You know, Uncle, you promised to tell me of some of the things that you used to make when you were a boy, and describe how you made them. It rains this afternoon and I think this is just the time."

Although I was quite busy when my nephew

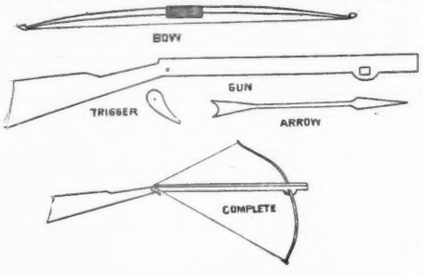


FIG. 1. THE CROSS GUN.

made this request, I was glad to gratify him, so I took out a piece of paper to illustrate, and began by asking him if he ever made a cross-gun, or, as some called it, a bow-gun.

"No, sir; what is it?"

"It is made like this: Get a good piece of birch or oak—birch is the best—and make a strong bow about three feet long, just as you would for an ordinary bow and arrow, only the middle of the bow is made square for about two inches, tapering toward the ends. Be sure both sides are even, as it will shoot better." Then I made him a picture of the bow as shown in the illustration in Fig. 1.

"Now cut from a piece of pine board about an inch thick a model of a gun, having the barrel about one and a half inches thick. Within six inches of the end of the barrel on the under side make a knob, and cut a square hole in it just the size of the middle part of the bow, being sure to make a tight fit. It should be like this:" and I drew an outline of the gun, as shown.

"The top of the barrel must be grooved like the letter V to receive the arrow, and at the end of the groove a notch is cut, to which you can attach a trigger, or the string can be pushed up with the finger. If you make a trigger, make it the shape of the diagram shown, and you will find that it will throw up the string nicely if screwed on just in front of the notch. The arrow can be made of a piece of pine wood. Make it like an ordinary arrow, but have the shaft wider and thinner than usual, like the one in the cut. Now you can put

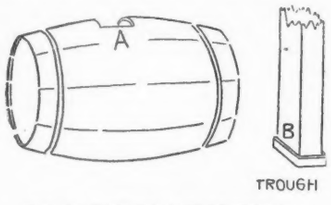


FIG. 2. BARREL AND TROUGH.

the bow into the barrel, string it up, and there is the complete cross-gun, like this," and I drew a picture of the gun complete.

"Do you think you understand this well enough to make one?"

"Yes, sir, and I am going to try; but first I want to make a house for the two rabbits that Willie Mason brought over this morning. Father says I may keep them if I will make a safe pen."

When I was a boy I used to keep rabbits, and I knew just how to make what he wanted, so I replied:

"In the first place dig a hole about five feet deep and large enough to put in a large box, or a barrel. I think your father will give you an old barrel for the purpose. Saw out a hole at the bung about eight inches square. After you have placed the barrel in the right spot fill it full of earth and then build a trough from the barrel to about a foot from the top of the ground."

"I wish you would draw me a picture of it, Uncle, for I can understand so much better when I can see how it looks on paper."

So I drew a picture of the barrel with the hole in the top at A, as shown in Fig. 2. Then I made a picture of the trough, and then one of the pen complete, which I called Fig. 3.

"The trough is made by nailing four boards together, and nailing some pieces of wood at the place marked B to keep it from slipping into the barrel and for fastening it to the edges of the square hole. After fastening it to the barrel fill it with earth. It must be placed in a slanting position, for the rabbits could not climb up a straight surface. Then make a floor about four feet square, with an opening for the trough, as shown in Fig. 3 at C, and nail boards a foot wide around it which will bring it up even with the ground, as at D. D. Pack the earth all around the barrel and trough and then make a floor as large as you wish the pen to be. The square place in the center must then be filled with earth, and if you can get some turf put that over it. Then build the pen upon the floor as high as desired, either of slats or of poultry netting."

"But why do you make all the underground part?"

"Because rabbits like to burrow, and they do much better if they can do so. They will dig all over the square box of earth and will find the trough because that is the only place by which they can get down. There is room enough in the barrel to satisfy them, and they will at once make a nest. They will be perfectly contented with this pen because they can dig freely and at the same time they cannot get out, so your father will not have cause to complain."

A few days later I was called out to see the rab-

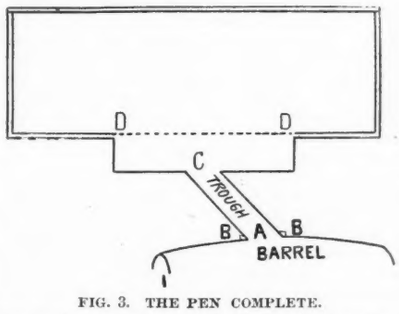


FIG. 3. THE PEN COMPLETE.

bits in their new pen and the boy had made it exactly as I have described it.

What a Society Teaches.

LUCY ELLIOT KEELER.

What half-dozen boys or girls can meet together a few times without forming themselves into a club, drawing up a constitution, taking to themselves some magic initials, and adopting a badge? The society spirit pervades the air. Debating clubs, King's Daughters, college fraternities, Browning coteries, orders, lodges, one after another would each, as Charles Dudley Warner says, "mortgage another precious portion of the little time left us for individual life."

All of these organizations have, however, a common excellence. Each is a school of precept and practice in parliamentary law. Here the boy and the girl learn the meaning of terms and the use of forms, and come to regard them with both the necessary respect and the allowable lightness. Such young people are not thrown into confusion at being asked to act as secretary pro. tem., and are competent to introduce a resolution, or second a motion. Here young women learn to manage their own meetings without calling in a man to preside, or wasting time in endless trivialities. The man or woman who is ignorant of parliamentary law labors under the disadvantage of an author who has never learned the mechanical part of writing, or an actor who has never mastered gesture. Forms must become familiar, else they will obstruct rather than clear the channel of thought and action.

Remember, however, that the letter alone kill. eth. It is the spirit that giveth life. Dwelling upon ceremonies and "exalting them above the moon," as Bacon says, "is not only tedious but doth diminish the credit of him that speaks." Do not fill your meetings with even the most skillfully managed tactics after Cushing or Roberts. Do not, as so many women do, have too awful a sense of the importance of parliamentary rules. I have heard dozens of persons say: "What a wonderful parliamentrician Miss Willard is!" Happily Miss Willard's greatness does not rest upon this adeptness. It is only knack and practice, like being a good auctioneer. Some of our greatest orators boast of not understanding the intricacies of rules. They leave that to lesser minds. Webster, for instance, used to say when a question arose, "Oh, I do not know anything about that;" or, "You will have to ask my neighbor here; he knows all that." None of us, however, are Websters, and we can afford neither real nor affected ignorance of the rules of order.

Fun for the Boys.

HOLLISTER SAGE.

Since the days of the early Latins, perhaps from an earlier time, boys have had their sports, and none of the athletics has been enjoyed more than the leaping of posts. But many a harsh fall and torn garment has resulted. Nevertheless, we cannot afford to forego any of the innocent games in use, particularly those of a stirring character. Boys confined to study must have exercise; their bubbling enthusiasm must have vent, or something serious will happen, perhaps, like what a neighbor's son expressed: "Why, pa," said he, "If I don't run and holler, and jump, pretending I am on horseback following a pack of foxhounds, I shall explode! I can't keep quiet all day." And he was as near right as the average man. But falls, and sprained wrists and torn clothes are not necessary accompaniments to leap-frog, and should not be to post-jumping. Every playground should have one or more heavy posts, set deeply to prevent being loosened, and with twelve to eighteen inches of the top sawed off and hinged in place with a heavy strap hinge (see Fig. 1). Long strong screws will be necessary. Getting on the opposite side from the hinge the highest jumper in school can pull as hard as he likes and clear it with one grand bound. If the next best fellow cannot quite do it, the post as he brushes it will simply break apart, and as the head-block snaps against the side (see Fig. 2) will proclaim his defeat before he reaches the ground. Its spiteful clack will incite to increased effort, and now in a two-inch auger hole bored in the top of the post, wooden pins may be placed, first a short one, and then longer ones as the ability of the horses in the steeple-chase improves. The difficulty of flying clear of the pins will be greater than to leap the post, as only the top of the post can be grasped, however tall the pins may be.

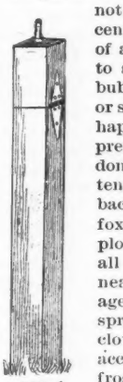


FIG. 1, HINGED POST.

FIG. 2. HEAD-BLOCK REVERSED.

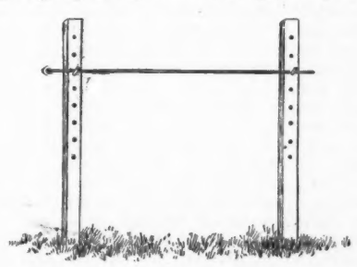


FIG. 3. LEAPING BAR.

Another excellent sport is the light pole or cane held up on two posts by small pins which may be raised or lowered by pulling out and replacing them in other holes bored for the purpose (see Fig. 3). The athlete jumps over the reed from the side opposite the one shown in the cut. If not agile enough to clear it he knocks it off the pins and comes down with it amid the laughter of all who look on. Nothing adds to a well-developed physique so much as all-round suppleness. The

boy who excels in sports usually makes a competent and successful business man.

General Lafayette's Fast Ride.

ALICE E. PINNEY.

The hero of this sketch, John ——, was a tall, good-looking lad of sixteen. On that particular evening, about sixty-seven years ago, he was pacing back and forth in front of one of those famous old country taverns of New England, the center of an admiring crowd of boys and men. He bore himself loftily, for was he not to drive the coach which was to carry the great Gen. Lafayette to Hartford on the morrow? And what boy of sixteen would not be proud, even in these days, to wait upon such a distinguished visitor as Gen. Lafayette?

This was on the occasion of Lafayette's visit to this country, in the fall of 1824; and the great general, with his escort of some of the most prominent men in the country was on the way from Boston to the city of Hartford. In those days the people traveled entirely by stage across the country. The proprietor of a stage took great pride in his equipage; the gaudily-painted coach was drawn by the best of horses, and the drivers drove with the skill of ancient charioteers. John was young to be trusted with the care of the coach and horses, but, as his father was the proprietor of both tavern and coach, he had been used to horses from his babyhood, and his father trusted him implicitly.

John had never seen so distinguished a person as Gen. Lafayette; much less had the coach ever carried so royal a passenger. So while his father, who had fought for his country in the same war in which Gen. Lafayette had distinguished himself for his bravery and generosity, and his mother, who had listened for hours at a time to her husband's stories of those old revolutionary times, were busy indoors with preparations for the General's entertainment, John looked after the welfare of the four fine steeds which were to carry them on the way.

The horses had been fed and groomed, and now he was anxiously awaiting the arrival of their expected guests. His mother was bustling about, ordering the maids here and there; at one moment intent on the arrangements for her guest's comfort in his sleeping apartment, and at another attending to the feast that was being prepared, while his father, with two old revolutionary heroes of the town, all gorgeous in velvet knee-breeches and buckled shoes, waited in the parlor, or keeping-room as it was then called.

This room had been newly papered and furnished for the occasion, and was afterward kept in the same order for years, and visited by many people on account of having been occupied for a short time by Gen. Lafayette. Wallpaper was something new at that time and was considered too grand and costly for common use. This was something unusual for the country, and had been imported for the occasion. It was of unique pattern and large figure, and remained on the walls of that room until as recently as 1889, when the old brick tavern was remodelled; and at the time of removing it many people saved scraps of the old paper as historic relics.

The coach was expected to arrive from the North at about dark; but just as the shades of evening began to settle down over the valleys which lay between the hills that surrounded the old brick tavern, a courier rode up to the little group waiting in front of the tavern bringing word from the General that, on arriving at a town a few miles north, he was so weary he had concluded to stop there to rest for the night, but would drive to V—— in time to breakfast with them the next morning. He was true to his word, and reached V—— early the next day. There he found an appetizing breakfast awaiting him as well as three of his old revolutionary friends. Breakfast was served in the parlor; and, after enjoying a social meal and friendly chat with his old comrades, the General proceeded on his journey.

I doubt if John ever knew so proud a moment in his whole long life (for he lived to be an old man) as the one when he mounted the driver's seat on the coach, cracked the long whip over the backs of the four coach horses, and they rattled away from the tavern amid a chorus of farewells and cheers of "Long live General Lafayette!"

The horses seemed to realize that the coach contained a royal visitor; they arched their glossy necks proudly as they sped on their way, past lonely farmhouses, through woods which might be lonely at night but which were fresh and sweet in the early morning, as if their sole mission on earth was to provide a home for sweet-singing birds. Now they passed over a gloomy piece of road where the branches of the tall trees interlocked overhead; then out into an open space, where the sun burst through and kissed the dew from the flowers that were sprinkled plentifully over the green mosses; finally descending the hill leading down into the Connecticut Valley. The city of Hartford, although several miles distant, was plainly to be seen, while the long line of fog hovering over the river lay like a heavy cloud waiting to be dispelled by the sunshine, and marked the course of the old Connecticut.

As they descended into the valley Gen. Lafayette spoke to John in a complimentary way about his fine horses and the pleasant ride they were having. It occurred to Johnny that now was the proper time to show their speed. He had previously trained them to respond to a particular whistle with their very best rate, and when they came to a level piece of road, with scarcely a rise for several miles, John drew the reins tight, gave the signal, and away they sped like the wind. They fairly flew past the trees which lined the roadside, and the wheels of the coach scarcely seemed to touch the bridges which spanned the small streams. As they continued to keep the same rapid gait, the General grew frightened and one of his companions anxiously thrust his head out of the coach window and shouted, "Are they running away? Can't you stop them? Hold on tight, boy!" etc.

But John said never a word, and it did not occur to him that as the General and his friends had been traveling by stage for several days they might be too weary to enjoy such a thorough shaking up. At last the horses slackened their pace and, after a few inquiries, the occupants of the coach learned that the treat which they had experienced was quite a usual occurrence on that route. The horses walked demurely over the long covered wooden bridge across the Connecticut river (the same bridge of to-day, which was then in its infancy, it having been built in the year 1818), on into the city of Hartford to the stopping-place of Gen. Lafayette, which, if I remember rightly, was the "United States Hotel," where the General related his morning's adventure, treating it as an excellent joke; and after putting a French piece of gold of generous denomination into John's hand, which he cordially shook at parting, he went inside to play the hero to a more important audience, while John played the hero to the outsiders. As a child I have listened to the story of John's boyish exploit many a time, and only a year ago I heard him as a feeble old man in the eighties relating it with a hearty laugh.

Something a Little Girl Can Make.

Open a sheet of fine imported tissue paper, fold in the center, lengthwise, once, then fold the other way twice, and cut. There will be six squares. Fold across, cornerwise, three times, cut a deep round scallop, and unfold. You have six rounds of eight scallops each. Use four sheets, of any shade desired. Fold and cut each sheet the same as the first. Take one round of the paper, fold one scallop lengthwise in the center on one wire of a common hairpin, holding the head of the pin in the right hand. Press the paper into gathers with the left hand, pressing towards the right, without breaking the paper. Shirr each scallop in this way, then take one round of each shade, from dark to light, and tack together in the center, and you will have six handsome mats. Some decorate them by taking some rose-colored paper, red, pink, yellow, and cream-white. Fold and cut in the same way three rounds of each color—size three inches each; shirr in the same way. Take a piece of yellow paper on a wire for the center, put them on the wire, and you have a handsome rose. Place, equal distances apart, one of each shade around the mat, and fasten in place.

The Guild of Honor.

The suggestion contained in the December issue of this magazine of an institution of the above title, under the auspices of the AMERICAN AGRICULTURIST, is meeting with gratifying response from our readers. We go to press with this page too early to more than call renewed attention to the matter, and to invite all interested to contribute their views immediately, as requested in our last issue.

OUR GREAT PUZZLE CONTEST.

ONE HUNDRED AND SEVENTY-FIVE DOLLARS' WORTH OF PRIZES.

First Prize.—A splendid safety bicycle, one of the best standard makes, cushion tire, all improvements, **Price $135.00.**

Other Prizes.—2. A World typewriter, $8; 3. American telescope, $3; 4. Florence plush toilet set, $2; 5. a gentleman's shaving set, $2; and twenty-five more prizes, worth $1 each.

We usher in the second half century of the AMERICAN AGRICULTURIST with a puzzle scheme that will interest young and old. The answers teach a lesson of importance and practical value to every one in the great AGRICULTURIST family, rich or poor, in country or city. With such liberal prizes, the contest is confined strictly to our subscribers, who must, therefore, fill out the coupon on the last page of this issue, and inclose it with their reply. No answer can compete that does not inclose the coupon referred to, properly filled out; but those who are not subscribers, or whose subscriptions are about to expire, can compete by sending in their subscription with their puzzle answer, as the coupon provides. The prizes will be awarded for the most perfect lists of answers received in this office before 9 o'clock, on the morning of February 1, 1892. If there should be more than one perfect list, the first prize will be awarded to the one which presents the neatest appearance in every respect. Mistakes in spelling will be counted as errors, and, in considering tied lists, special attention will be paid to the arrangement and writing of the same. No two answers will be allowed to the same puzzle; that is, contestants must not say the answer is this *or* that, as answers of that kind will be thrown out entirely, even though one of them might be right. Contestants may get help from any one they please on the puzzles, but no two lists will be received from the same family. All letters for this contest must be addressed to the Puzzle Editor, AMERICAN AGRICULTURIST, 52-54 Lafayette Place, New York.

1.—ANAGRAM.

A truth for farmers:

Woods I guy, I do not sigh
Alone for unfledged bliss;
Oak oar grasp I, love water,
Try win this.

2.—ILLUSTRATED REBUS.

A fact for farmers.

3.—CHARADE.

My first has slain thousands.
My second lighted millions.
And my whole is the best of my last, which you all hope to get.

4.—ENIGMATICAL ACROSTIC.

The letters are represented either by numbers or the letter X.

1 X X 19 10
2 X X X X X X 11
3 X X X 12
4 X X X X X X 13
5 X X X X X X X 14
6 X X X X X X 15
7 X X X X X X X X 16
8 X X X X X X X X X 17
9 X X 20 18

From 1 to 10 is a kind of fowl.
From 2 to 11 is a sacrifice.
From 3 to 12 is a fine fruit.
From 4 to 13 is a fragrant plant.
From 5 to 14 is a substitute.
From 6 to 15 is a favorable opportunity.
From 7 to 16 is a preservative against contagious diseases.
From 8 to 17 is contention.
From 9 to 18 is discernment.
From 1 to 9 and from 19 to 20 is a fact that farmers should know.

5.—COMPARATIVES.

To depart, blood; an animal, an entrance; part of a fish, to shout; help, a girl's name; a winter product, a product of night; an animal, to quail.

Take one letter from each word, and find what we are wishing for.

Example. — A stain, comparative terrible; answer, dye, dire.

THE PRIZE AWARDS FOR NOVEMBER.

First prize, 739 names, Mrs. Eldora Osterhoudt, Box 3000, Rondout, N. Y.

Second prize, 682 names, B. W. Summy, M. D., Vienna, Va.

Third prize, 676 words, Mrs. G. F. Hubbard, 1210 Hannon place, Minneapolis, Minn.

Fourth prize, 672 names, Mrs. M. E. Cooper, care Johnson & Hurd, cor. Fourth street and Third avenue, S. Minneapolis, Minn.

Fifth prize, 670 words, Ruth Palen, 2130 Camac place, Philadelphia, Pa.

THE ANSWER TO THE NOVEMBER PUZZLE.

Acasto, Mo.
Acme, Ind.
Acoma, N. M.
Acona, Miss.
Acting, Tenn.
Acton, Cal.
Actus, Ark.
Ada, Ala.
Adana, Col.
Adaton, Neb.
Adel, Ga.
Adele, Cal.
Adelia, Ala.
Adell, Kan.
Aden, Miss.
Adena, O.
Adin, Cal.
Adlai, W. Va.
Adona, Ark.
Adonde, Ariz.
Agosta, O.
Ai, O.
Aid, Ill.
Ain, Ark.
Alamanda, Pa.
Alamando, Mich.
Alameda, Cal.
Alamo, Cal.
Alaska, Ind.
Alco, Ala.
Alcona, Kan.
Alda, Neb.
Aldai, Minn.
Aldie, Va.
Ale, Ore.
Aledo, Ill.
Alem, W. Va.
Aleman, N. M.
Alena, Tenn.
Alila, Cal.
Allen, Cal.
Alna, Me.
Aloe, Tex.
Alone, Ky.
Alosta, Cal.
Alston, S. C.
Alto, Ala.
Alton, Ill.
Altona, Ill.
Alwilda, S. D.
Ama, La.
Aman, S. C.
Amana, Ia.
Amanda, O.
Amasa, Pa.
Amedee, Cal.
Amo, Ind.
Amoca, Wash.
Amoles, N. M.
Anacoco, La.
Anaconda, Mont.
Ancona, Ill.
Andes, N. Y.
Anding, Miss.
Andis, O.
Anita, Ia.
Anoka, Ind.
Anon, Ga.
Anona, Fla.
Antone, Kan.
Aonia, Ga.
Asa, Mich.
Asaton, Tenn.
Askam, Pa.
Asper, Mo.
Aspers, Pa.
Aster, Tenn.
Asti, Cal.
Aston, Pa.
Astonia, Tex.
Astor, Fla.
Atco, N. J.
Atsion, N. J.
Auvil, W. Va.
Ava, Ill.
Avalon, Cal.
B, Ind.
Bland, Ark.
Blandon, Pa.
Blendon, Mich.
Boalt, Wis.
Bob, Ala.
Bobo, Ga.
Bodan, Tex.
Boie, Ia.
Boden, O.
Boen, Ala.
Bois, Ill.
Bolan, Ia.
Bole, Neb.
Boleman, S. C.
Bolen, Ga.
Bolsa, Cal.
Bolt, Ore.
Bolton, Ct.
Bon, Wis.
Bona, Wyo.
Bond, Kan.
Bone, N. C.
Bono, Ark.
Bonton, Tex.
Boston, Mass.
Botland, Ky.
Botna, Ia.
Cactus, Tex.
Cain, Kan.
Cana, Cal.
Canada, Kan.
Canal, Ind.
Canan, Pa.
Canawana, N. Y.
Candia, N. H.
Canon, Wash.
Casa, Ark.
Case, Neb.
Cases, N. C.
Cat, Ky.
Cata, Ida.
Cat Island, Ark.
Cato, Ark.
Caton, N. Y.
Catos, Ga.
Clio, Ala.
Cliola, Ill.
Clione, Mo.
Clive, Ia.
Clones, Mo.
Coast, Cal.
Coats, Ark.
Coatsville, Mo.
Coco, W. Va.
Cocoa, Fla.
Coila, Miss.
Cokato, Minn.
Cole, Ala.
Coles, Ill.
Colesville, Md.
Colleen, Va.
Colma, Cal.
Colman, S. D.
Colma Station, Cal.
Colo, Ia.
Colokan, Kan.
Coloma, Ala.
Coloma Stat'n, Wis.
Colon, Mich.
Colona, Ark.
Colona Station, Ill.
Colono, Kan.
Colville, Ark.
Como, Ark.
Concan, Tex.
Conclave, N. C.
Conde, Ala.
Condon, O.
Condit, O.
Condon, Col.
Cone, Fla.
Conejo, Cal.
Conejos, Col.
Conel, Tex.
Conestoga, Pa.
Conesus, N. Y.
Conesville, Ia.
Congin, Me.
Congo, Pa.
Conomo, Miss.
Cos, W. Va.
Cosmo, Fla.
Cosmos, Minn.
Coso, Cal.
Cota, Cal.
Cotaco, Ala.
Dade, Ark.
Dago, Ala.
Dalles, Ore.
Dan, Ala.
Dana, Cal.
Dane, Wis.
Dania, Minn.
Dant, Ky.
Danton, Ga.
Data, Ala.
Daton, Ga.
Dawes, O.
Daws, N. Y.
Deal, Ind.
Deals Island, Md.
Dean, Ala.
Deane, Ky.
Deanes, Va.
Deaslee, Ark.
Dee, Ark.
Deemston, Pa.
Delana, Ill.
Deland, Fla.
Delano, Cal.
De Leon, Tex.
Delia, Tenn.
Delila, Va.
Dell, Mass.
Della, Md.
Dellia, Mo.
Dellona, Wis.
Delma, Tex.
Deloit, Ia.
Delong, W. Va.
Delto, Mo.
Delton, Mich.
Denman, Miss.
Dent, O.
Denton, Ga.
De Pere, Wis.
Deselm, Ill.
Desoto, Ga.
Devall, La.
Dinan, Miss.
Dingo, Me.
Dit, Mo.
Ditto, Mo.
Dlo, Miss.
Dob, Ark.
Dodo, Ga.
Dola, W. Va.
Dolan, Ind.
Doland, S. D.
Dolton, Ill.
Don, Ark.
Donelton, Tex.
Dot, Ala.
Dota, Ark.
Eades, Miss.
Eal, Cal.
Easom, Tex.
East Acton, Mass.
Eastanollee, Ga.
East Candia N. H.
Eastep, Ala.
Easter, Ark.
East Island, N. Y.
East Kane, Pa.
Easton, Cal.
East Rome, Ga.
East Salem, Pa.
Easy, Mich.
Eaton, Col.
Eda, Okla.
Edella, Pa.
Edelman, Pa.
Eden, Ala.
Edenton, Ky.
Edesville, Md.
Edgington, Ill.
Edie, Pa.
Edina, Mo.
Edna, Ala.
Edon, O.
Ela, Va.
Elam, Pa.
Elams, N. C.
Elam Station, Tex.
Eland, Wis.
Elena, Cal.
Eli, W. Va.
Elias, Ala.
Ella, Pa.
Ellio, O.
Elm, Ga.
Elma, Ia.
Elma Station, N. Y.
Elmo, Ark.
Elna, Cal.
Elo, Wis.
Elon, Ark.
El Salem, Wis.
Elston, Ind.
Elton, Ala.
Elvilla, Pa.
Enal, Ga.
Endee, N. M.
Eno, O.
Enola, Ark.
Enoma, Wis.
Enon, Ala.
Eola, Ill.
Ep, Ky.
Epes, Ala.
Epsom, Ind.
Epsy, Ark.
Eros, Ark.
Esau, Ark.
Espy, Pa.
Esrom, Mo.
Est, N. C.
Estatoe, N. C.
Esto, Ky.
Estus, Wash.
Euto, N. C.
Eva, Ala.
Evan, Minn.
Eve, Mo.
Eves, Ga.
Eye, Ark.
Gad, Ala.
Ganado, Ariz.
Gano, Ill.
Gant, Mo.
Gato, Col.
Gi, Ala.
Gid, Ark.
Gig, Va.
Gin, Ark.
Gitano, Miss.
Goat Island, Cal.
Goes, O.
Goeselville, Ill.
Gognac, Kan.
Goin, Tenn.
Gose, Ky.
Iatan, Mo.
Ida, Ky.
Idalia, Col.
Idana, Kan.
Idavesper, Ga.
Idea, Ore.
Ideal, Ill.
Igo, Cal.
Ila, Ga.
Ilia, Mo.
Ilion, Ind.
Iliana, Ill.
Ilwill, Ky.
Ilo, Wis.
Ina, Tenn.
Inanda, N. C.
Inca, Va.
India, Tenn.
Indio, Cal.
Inland, Mich.
Ino, Va.
Iola, Ind. T.
Ioka, Ia.
Iola, Ala.
Ion, Ia.
Iona, Minn.
Ione, Cal.
Ioni, Tex.
Ionia, Kan.
Isis, O.
Isla, Neb.
Islana, Tex.
Island, Ill.
Isle, Pa.
Isola, Neb.
Ita, Miss.
Itata, Va.
Ives, Neb.
Ivie, Ore.
Iwana, Ala.
Jena, Ala.
Joan, Ark.
Joe, Ky.
Joel, Ga.
Joella, Fla.
Jo Jo, Pa.
Juse, Kan.
Justus, O.
Ka, Tex.
Kalama, Wash.
Kalamo, Mich.
Kalb, S. C.
Kalo, Ia.
Kalona, Ia.
Kamas, Utah.
Kamela, Ore.
Kamo, Ida.
Kane, Ill.
Kanoka, Mo.
Kanona, Kan.
Kaska, Mich.
Katan, Pa.
Kit, Ind.
Koko, Tenn.
Kokomo, Col.
Kolda, S. D.
Koleen, Ind.
Kollock, S. C.
Koloko, Kan.
Komoko, Mich.
Kong, Kan.
Ladiga, Ala.
Laka, Ore.
Lamollie, Ill.
Lamoka, Pa.
Lamong, Ind.
Lamoni, Ia.
La Nana, Tex.
Land, Ga.
Landes, Ill.
Landing, N. J.
Lane, Ill.
Lanes, S. C.
Lanesville, Ct.
Lang, Cal.
Langnan, Ky.
Langton, N. D.
Laona, N. Y.
La Osa, Ariz.
La Sal, Utah.
La Salle, Cal.
Laso, Ky.
Last, Cal.
Laston, Ga.
Lava, Ida.
Lavalle, Wis.
Law, Tenn.
Laws, Cal.
Lead, N. C.
Leakton, Ga.
Leaman, Ill.
Leando, Ia.
Leda, Va.
Lee, Ala.
Leelan, O.
Leeland, Va.
Leeman, Wis.
Leemon, Mo.
Lees, S. C.
Leesville, Cal.
Lelan, Tex.
Leland, Ill.
Lelia, Tex.
Lella, Tenn.
Lelon, Ga.
Lem, Tex.
Lementon, Ill.
Lemon, O.
Lemond, Minn.
Lena, Ill.
Lenado, Col.
Lena Station, La.
Leno, Fla.
Lent, N. Y.
Lenton, N. C.
Leo, Ga.
Leola, S. D.
Leon, Ala.
Leona, Kan.
Leota, Ind.
Lien, Tex.
Lile, Ala.
Lilesville, N. C.
Lilian, Miss.
Lillian, Ala.
Lillie, Ark.
Liola, Va.
Livia, Ky.
Llanda, Cal.
Llano, Cal.
Loa, Utah.
Loano, Ida.
Location, Ga.
Lock, Ky.
Lockman, Ind.
Locks, O.
Lockton, Pa.
Loco, N. C.
Loda, Ill.
Lodo, N. C.
Lois, Ga.
Lola, Ky.
Loland, Fla.
Lollie, Ark.
Lolo, Ida.
Loma, Cal.
Lomena, Tex.
Lomo, Neb.
Lomoka, Pa.
Lomond, Va.
Lonaconing, Md.
London, Ala.
Lonedell, Mo.
Lone Elm, Kan.
Lonelm, Ark.
Lone Oak, Tex.
Long, O.
Longton, Kan.
Lono, Ark.
Lonoak, Cal.
Los Osos, Cal.
Lot, Ala.
Mae, Tenn.
Makanda, Ill.
Malbone, Ga.
Malee, N. C.
Malone, Ia.
Malton, Cal.
Mamakating, N. Y.
Mamon, La.
Man, W. Va.
Mana, N. C.
Manasas, Ga.
Mandan, N. D.
Mandana, N. Y.
Mandell, Ill.
Mandota, Va.
Manes, Mo.
Mano, Mo.
Mast, N. C.
McKain, Pa.
Meda, Ore.
Medo, Minn.
Medon, Tenn.
Meesville, Ariz.
Melton, Ia.
Menan, Ida.
Mendon, Ill.
Mendota, Ill.
Menlo, Ia.
Menola, N. C.
Menomonee, Wis.
Menomonie, Wis.
Menton, Mo.
Mentone, Ala.
Meos, Minn.
Mesa, Ariz.
Moats, O.
Moatsville, W. Va.
Mock, Pa.
Mockonema, Wash.
Moe, S. D.
Moland, Minn.
Mole, Tenn.
Moleen, Nev.
Molena, Ga.
Mollie, Ind.
Mona, Ia.
Monaca, Pa.
Monango, N. D.
Monaskon, Va.
Monee, Ill.
Monell, Wyo.
Mong, Pa.
Mongo, Ind.
Monie, Md.
Mono, Cal.
Monon, Ind.
Monona, Ia.
Moore, Ark.
Moosa, Cal.
Morey, Mich.
Moro, Ark.
Morse, Ida.
Motor, Ia.
Mouses, W. Va.
Moville, Ia.
Nacona, Tex.
Nada, Col.
Nadeau, Mich.
Nail, Ind. T.
Naillon, Tenn.
Nain, Va.
Nakomas, S. D.
Nallville, Mich.
Namsos, Minn.
Naola, Tenn.
Nast, Tenn.
Nat, Ala.
Navan, Ia.
Naves, Ala.
Neal, Ark.
Neale, Tenn.
Neals, Miss.
Nealton, Ala.
Ned, Ky.
Need, Tex.
Neel, Ala.
Neels, Ind.
Nell, Ky.
Nellie, Ala.
Nemo, Tenn.
Neoga, Ill.
Neola, Ia.
Nina, Ky.
Nind, Mo.
Nington, Tenn.
Niota, O.
Niota, Ill.
Nita, La.
Noble, Ill.
Nobob, Ky.
Nocona, Tex.
Nodena, Ark.
Noel, Ia.
Noels, Va.
Noel Station, Ia.
Noeton, Tenn.
Nois, Pa.
Nola, Va.
Nolan, Wash.
Noland, Ark.
Nolo, Pa.
Nolton, Ark.
Nona, Ga.
Nono, Va.
Not, Mo.
Oacoma, S. D.
Oak, Ill.
Oak Island, Mass.
Oaks, Miss.
Oakton, Ky.
Oasis, Cal.
Oatka, N. Y.
Oats, S. C.
Oatsville, Ind.
Oconee, Ga.
Octa, O.
Octagon, Ind.
Octon, La.
Odee, Kan.
Odell, Ga.
Oden, Ark.
Odenton, Md.
Odon, Ind.
Oella, Md.
Ogan, Neb.
Ogdin, W. Va.
Oilville, Va.
Ojo, Col.
O. K., Ky.
Oka, Mont.
Okamon, Minn.
Okiola, Pa.
Okisko, N. C.
Okolona, Ark.
Okome, Pa.
Okonoko, W. Va.
Ola, Ark.
Olamon, Me.
Olean, Ind.
Olema, Cal.
Olena, Ark.
Olene, Ore.
Oleona, Pa.
Olie, Neb.
Olio, Ark.
Olive, Ariz.
Oliveville, Va.
Olivia, Ala.
Ollie, Ia.
Olnes, Neb.
Olo, Va.
Oma, Ark.
Omen, Tex.
Omena, Mich.
Omemee, N. D.
Omro, N. Y.
Ona, Ore.
Onaga, Kan.
Onalaska, Wis.
Onan, Va.
Onancock, Va.
Onawa, Ia.
Oneal, S. C.
Oneals, Cal.
Oneonto, Ala.
Oneota, Minn.
Ong, Neb.
Onida, Ga.
Onion, N. C.
Ono, Cal.
Onoko, Pa.
Onondaga, Mich.
Onota, Mich.
Onton, Ky.
Oowala, Ind. T.
Ore, Mo.
Orms, Wis.
Ormes, Wis.
Oro, O.
Ort, O.
Osakis, Minn.
Osanda, Ga.
Oslo, Minn.
Osman, Ill.
Osmans, O.
Osmond, Neb.
Oso, Wash.
Osro, Kan.
Ost, Kan.
Ostrom, N. J.
Oswald, Ga.
Otero, N. M.
Otia, Mich.
Otis, Col.
Oto, Ia.
Oty, Va.
Ovilla, Tex.
Ovo, Kan.
Owasa, Ia.
Owl, Ala.
Pea, Ala.
Peas, Miss.
Pease, Mo.
Peaster, Tex.
Pedigo, Tenn.
Pedlo, Ark.
Perote, Ala.
Per Se, Pa.
Pet, Va.
Peter, Ky.
Peters, Ala.
Petrey, Ala.
Petros, Ky.
Pye, Ga.
Re, Tex.
Rep, Ala.
Retort, Pa.
Retro, Tenn.
Roe, Ark.
Rome, Ala.
Romeo, Fla.
Rosa, Ga.
Rosalia, Kan.
Rosalie, Tex.
Rosas, Pa.
Rose, Kan.
Rosemoor, O.
Roses, Pa.
Roseville, Ark.
Rost, La.
Rote, Pa.
Rowan, Ga.
Rowe, Ill.
Rowes, Ore.
Roweville, Tex.
Rowland, Ala.
Row Landing, La.
Rows, O.
Sac, Tenn.
Saco, Me.
Sadie, Mont.
Saladito, Tex.
Salal, Wash.
Salanna, W. Va.
Salamonia, Ind.
Salem, Ala.
Sallee, Kan.
Sallie, Ala.
Saloma, Ky.
Salona, Pa.
Salton, Cal.
Sams, Ky.
Sanco, Tex.
Sandago, Kan.
Sandalia, Neb.
Sandels, Tex.
Sanel, Cal.
Sango, Tenn.
San Jose, Cal.
Sato, Ill.
Satus, Wash.
Sauve, La.
Sauvies, Ore.
Saw, N. C.
Sea, Tex.
Seago, Tex.
Seal, O.
Sealand, Wash.
Seaton, Ill.
Seawall, Me.
Sedalia, Col.
Sedan, Ala.
See, Ky.
Seed, Ga.
Selea, Pa.
Selena, N. C.
Sell, W. Va.
Selma, Ala.
Selman, Fla.
Seloc, S. C.
Selone, Va.
Senoia, Ga.
Sespe, Cal.
Seville, Fla.
Sewal, Ia.
Sewall, N. D.
Siko, Pa.
Sion, Tex.
Sioto, W. Va.
Sis, Pa.
Sisk, Mo.
Sitka, Ind.
Skagit, Wash.
Skanee, Mich.
Slanesville, W. Va.
Sloan, Ala.
Sloane, Col.
Smedes, Miss.
Smock, Pa.
Smocks, Ore.
Smolan, Kan.
Smoot, W. Va.
Smoots, Va.
Soest, Ind.
Soland, Minn.
Soledad, Cal.
Solo, Ga.
Solon, Ind.
Soso, Miss.
Soto, Cal.
Spero, N. C.
Stag, Md.
Station, Vt.
Step, Ala.
Steps, Mo.
Steptoe, Wash.
Stet, Mo.
Stod, Minn.
Stoel, Pa.
Stonington, Col.
Stono, Mo.
Storey, Mont.
Storms, O.
Stow, Me.
Stowe, Vt.
Strom, Va.
Sue, W. Va.
Svea, N. D.
Swan, Col.
Swango, Ill.
Swanington, Ind.
Tacna, Ariz.
Tacoa, Ala.
Tacoma, O.
Takoma, D. C.
Tang, Tenn.
Tanoma, Pa.
Taos, N. M.
Taus, Wis.
T. B., Md.
Tiago, Kan.
Tiana, N. Y.
Tidal, Pa.
Tidal Wave, Ky.
Tide, Va.
Tie, Pa.
Tignall, Ga.
Tina, Ark.
Tindal, S. C.
Tindall, Mo.
Tio, Tex.
Tioga, Pa.
Tiosa, Ind.
Tislo, S. D.
Tito, N. C.
Toana, Nev.
Toano, Va.
Toboso, O.
Toca, La.
Toco, Tenn.
Toga, Ind.
Toland, Wis.
Toledo, O.
Tolo, Ore.
Tolona, Mo.
Tolono, Ill.
Tolosco, Tex.
Tolt, Wash.
Tom, Ky.
Tome, N. M.
Tomes, Pa.
Ton, La.
Tonto, Ariz.
Toro, La.
Toto, Ind.
Towanda, Ill.
Trot, Tex.
Tucas, N. M.
Tut, Tenn.
Ty Ty, Ga.
Uvilla, W. Va.
Vail, Ia.
Valda, Tex.
Valdai, Col.
Valle, Mo.
Vallejo, Cal.
Vallena, Va.
Valles, Col.
Vallie, Col.
Valona, Cal.
Vallonia, Ind.
Van, Minn.
Van Allen, Cal.
Vandalia, Ill.
Vang, N. D.
Van Liew, N. Y.
Vasa, Minn.
Vase, Pa.
Veda, N. M.
Velonia, Ind.
Veo, Ia.
Vesper, Kan.
Vest, Ky.
Vester, O.
Vests, N. C.
Veve, Mo.
Vian, Ind. T.
Viana, Fla.
View, Utah.
Vilas, Col.
Villa, O.
Villas, Ill.
Vilonia, Ark.
Viola, Ala.
Viona, O.
Vivian, Ga.
Wade, Kan.
Wades, Va.
Wall, Ill.
Walle, N. D.
Wallen, Ind.
Wallonia, Ky.
Wallview, Tenn.
Wallville, Md.
Wanda, Ill.
Wango, Md.
Wano, N. D.
Wasp, W. Va.
Wawa, Pa.
Wawawai, Wash.
Weil, La.
Wem, Ill.
West, Ala.
Westers, Tenn.
West Rome, N. Y.
Wests, Col.
Wilawana, Pa.
Wilde, Col.
Wildie, Ky.
Wilding, W. Va.
Wiles, Ind.
Willada, Wash.
Willie, S. C.
Willock, Pa.
Wilna, Md.
Wilno, Minn.
Worms, S. D.
Y, Mich.

CHAT WITH CORRESPONDENTS.

Our list contains 959 names. As there was no time limit given for the November contest, lists were received up to December 1. All lists received later than that were not considered. Many large lists were cut down on account of misspelled words. Contestants cannot be too careful in preparing their answers, for accuracy is absolutely necessary in these puzzles.

J. E. W., Colorado: The Puzzle Solver, by Jennie Jameson, gives full directions for working out puzzles of all kinds, and much other information of a useful character for contestants. It will be sent to any address, on receipt of ten cents, by the Puzzle Editor of the AMERICAN AGRICULTURIST.

I wish to acknowledge the receipt of the Mineral Cabinet, for which accept many thanks. I was better pleased this time than if it had been one of the higher prizes, for it was just what I had been wishing for.—[STEWART JONES, Hamilton, N. Y.

I received the piano lamp as a prize for solving puzzles in the August number, and am well pleased with it. Please accept my thanks for the same.—[DAISY D. LAYTON, Summitville, Ia.

A Boy's Experience in Duck-Raising.

RUTHERFORD B. AYRES.

I first put a dozen duck's eggs under a hen, and when three weeks had passed she would sit no longer. It happened there was another hen wanting to sit, so we put her on the eggs. As soon as the first duck peeped she too went off, and we took the eggs into the house and hatched out eight little ducklings by the stove. We took a great deal of pleasure in watching the little things grow. We made a pen for them in the back yard and sunk a tub in it, which we always kept full of water. We ate the most of this lot. About a year after this, while my father was cutting thistles beside the road, he saw a wild duck fly up. He went to look at the place from which she flew, and found a nest containing eight eggs. The next day we looked at the nest and found that the old duck had not been back, so we took the eggs and put them under a hen. When the eggs began to hatch the hen picked their heads, and had them killed before we knew it. The next year we bought a dozen duck's eggs and put them under a hen again. Soon we discovered that the hen was crazy, for when she went to drink she would throw her head back till it touched her back, and then she would walk back a few steps. The other hens took advantage of it, and fought her when she was on the nest, and broke most of the eggs. At last a hen managed to drive her off entirely, and she did not hatch a single duck.

"One Touch of Nature Makes the Whole World Kin."

My acquaintance with the AMERICAN AGRICULTURIST commenced some time in the fifties, being the pioneer subscriber at my post office. In 1863 our house was burned, together with many books, and, what I regretted most, a complete file of the AMERICAN AGRICULTURIST. The April number of 1864 is now the oldest issue in my possession. The sign of "Taurus" is at the head of first column; it has no cover as now. The articles have no authors accredited, except M. Quinby "by request" prepares an article entitled "Apiary in April."

In looking over the succeeding numbers a gradual and steady improvement in its general appearance, beauty of illustration, and value of reading, matter becomes apparent at every step. The AMERICAN AGRICULTURIST has always been recognized as the standard agricultural periodical by all classes. It is said and truly said, "that one touch of nature makes the whole world kin."

Your delineation of farm life is close to nature, so close that it is a strong lever to arouse the dullest intellect and improve it. And now when I look at the AMERICAN AGRICULTURIST in 1864 and compare it with that of 1891, I am candid in saying that I believe it has kept pace with the times in all its make-up. The high standard of the magazine in its infancy has been more than maintained. The editors have always kept in mind that the masses are in the alphabet of advanced agriculture, and, in order to reach them, give plain, practical articles in a terse, condensed form adapted to all climates and conditions. May the grand old AMERICAN AGRICULTURIST continue in deserved prosperity.

JASPER N. DAVIDSON, Montgomery Co., Indiana.

Southwestern Missouri.

The farmers of this part of the State have no reason to complain. The wheat was very good, with fine weather to gather the harvest. Grass was fairly good, and in some places heavy. The corn crop was as good as any ever raised, and apples abundant, many of the orchards bearing as heavy a crop as the trees could sustain without injury. This region is very certain for apples, and when they fail here, there is little chance elsewhere. A short season of dry weather prevailed in harvest time—June and early July—but abundant rains have fallen and the pastures and meadows are as green as in early May or June. Potatoes do well if they are planted when there are no bugs, but too many farmers think corn and wheat are the only crops worth attention, and the acreage of potatoes is small. Tomatoes, melons and the like could not be better, and sweet potatoes gave a great yield. We have a fine climate, neither too hot nor too cold; a soil that will produce any grass, grain, fruit or vegetable raised in the temperate zone; and pure water from ever-flowing springs.

It is also a region of boundless resources in minerals, coal, iron, lead, zinc, and valuable clays and fine stone. This part of the country between the Missouri and the Arkansas rivers is certain to have a large and thriving population. The elevation is 1,200 to 1,800 feet above sea level, which secures excellent drainage and abundant water power. Timber for building and fuel is inexhaustable in the Ozark regions.

"ALEXANDER," Springfield, Missouri.

Lima Beans in Southern California.

During the early part of the past season prospects for a heavy yield of lima beans, in the coast countries of Santa Barbara and Ventura, in Southern California were remarkably good; the country of Ventura alone is estimated to have thirty thousand acres planted in the lima bean. The unusually hot spell of the latter part of July, and all of August, materially affected the prospects of a rich harvest. Probably not more than one-half to two-thirds of a crop has been harvested, those nearest the ocean suffering the least. Some attribute the hot spell to the submersion of the desert, now called "Salton Lake," by the influx of water from the Colorado River. This, however, is mere conjecture. The longer one resides in California, the fewer will be his theories in regard to any phenomenal meteorological changes or conditions of climate, as, after any curious occurrence, the weather settles down to its good behavior, and stays so for some time.

L. G. YATES, Santa Barbara Co., California.

Fruits of Southeastern Florida.

Strangers will scarcely realize that Dade County, Florida, is about the size of Massachusetts, and that its peculiar climate demands special consideration. It may be new to many of the readers of the AMERICAN AGRICULTURIST that what has lately been published of Jamaica can be truthfully said of this part of Florida. Most Northern writers give it only the credit of having the climate of the rest of Florida, or of Southern California. The Gulf Stream in its ceaseless flow has brought up a fragment of the torrid zone, and given Dade County a nearly tropical climate far north of the tropic. Few can realize the immense variety of fruit that may be gathered on a single lot. The grape, mulberry, and strawberry are here, and we can gather in our garden and grove nearly all the semi-tropical fruits, as the orange, lemon, lime, pomelo, shaddock, the fig, and the olive. But it is the fruit of the tropics that gives character to the region. All along the shores of Lake Worth, and southward, down the coast may be seen thousands of cocoanut palms, dropping their ripened fruit every day in the year. Here also the banana is always maturing its fruit; and at every season of the year the pineapple may be seen sending up her crimson stem. The guava never quite forgets to yield its fragrant and delicious fruit. The sapodilla, also, that grand russet fruit treasure of the tropics, which, while it has its special ripening season, continues to yield us a little fruit throughout the year. The pawpaw (*Carica Papaya*) never ceases to offer us its melon-like fruit, a delicious luxury to all and more especially to the dispeptic invalid. The ceriman (*Monstera deliciosa*) will always exhibit its cone-like treasures.

E. GALE, Dade Co., Fla.

Kansas Products.

The past season has been one of marked success for the farmers of Kansas. Nature has been very generous in her gifts, to all who sought her favors in becoming manner. As to prices, we have little to complain of, taking the whole routine of crops. Fruit has been low, but, in this section, I have rarely known all kinds, cultivated and wild fruits more plentiful. Twenty-five years ago one could scarcely see a wild blackberry bush. Now, many large markets are chiefly supplied from this source; and of a quality I have never seen excelled. Of gooseberries, many farmers' wives depend upon the wild fruit; and for jellies, nothing excels, if indeed equals the wild grapes that grow in profusion in our timber lands. Improvements of farm buildings go steadily forward, and it is astonishing to see how the size and quality of the barns being built, increases and improves. One of my neighbors, an Americanized German, put up quite a large barn this summer; and the material is as good as would be put in a $10,000 house.

A. G. CHASE, Leavenworth Co., Kansas.

Rhode Island's Onion Crop.

The onion crop in Bristol Co., R. I., was abundant last season, and good, notwithstanding a dry summer, but prices were so low as to discourage future enterprise in their cultivation. First-class onions were sold as low as forty-five cents per bushel. But a small portion of the land once profitably occupied by this crop is now devoted to it. Before the loss of the West Indian trade, a large number of people found profitable employment in their cultivation, but poor markets have nearly destroyed the industry, and nothing has been found to take its place.

D. LOUP, Bristol Co., R. I.

From the Land of Giant Trees.

To a stranger coming over the Rockies from a Manitoban winter, the startling change in the atmospheric condition, with its consequent effect on vegetable and animal life, creates an enthusiasm for this "land of giant trees." The prevailing conditions at once suggest industrial possibilities that will in all probability before long bloom into a prosperous reality. Fruits which, in the central portion of this Dominion are unknown, except through the mediation of the railroad, here ripen to a luscious perfection, due to the mild and humid climate which is universal on the Pacific slope. Vast expanses of forest stand in the way of immediate agricultural development, but the sawmills on the one hand, and the energy of the land owners on the other, will soon make a preceptible change in the appearance of the land surface.

EDMUND PARKER, Vancouver, B. C.

Subarctic Farming.

This is, so far as I am aware, the most northern farming community on the American continent. We are situated in latitude 58° 45′, and longitude 114° W. I hope none of your Eastern readers will shiver at this mention of the far North. I came from the East in 1879, having spent my early winters between the River St. Lawrence and Connecticut, and I can say, after twelve years experience here, that, by far, my hardest shivering was in the East. When the winter sets in, which it usually does about the middle of November, it seldom thaws sufficient to melt the snow until the last of March, so that it lies as soft as feathers on the ground, and seldom exceeds two feet in depth, and frequently less than one foot. Horses graze the year round, and do wonderfully well. Cattle, as a rule, require to be fed from three to four months.

The country is in the hands of the Indians, who are peaceable, and some of whom we have induced to give up their roaming life, and take to a less precarious way of obtaining subsistence than by the chase, as game of nearly every kind seems to be getting scarce. The children readily take to domestic life, and are as apt to learn as the average white children. Spring usually opens about the 1st of April. Last year I began seeding April 27th. August 1st I began cutting the barley, and the wheat was ready toward the end of the month. None of the wheat from last year's crop yielded less than forty pounds of flour per bushel of sixty pounds. In addition to these crops, I have successfully raised nearly all the common varieties of garden vegetables, sometimes including tomatoes, beans, and cucumbers.

E. J. LAWRENCE, Peace River, Canada.

Where the Sun Shines Every Day.

Farming amid the frosts of the Rocky Mountains has its peculiar features. This region is vast and unlike other sections of our country. Where I am located we cannot count on more than sixty days of freedom from frost. Yet here potatoes of the finest quality are raised, and our potatoes are first-class, and the yield is bountiful. Our cabbages are without worms and weigh up to thirty pounds per head. Our oats and wheat yield, on the average, fifty bushels to the acre. Barley and rye are also grown successfully. Of course, with such short seasons, we cannot raise corn. I have been here five years and, during that time, there have been but two days when the sun did not shine, at least part of the day. The climate is delightful and for grazing, this region cannot be excelled.

H. HARPST, Achuleta Co., Colo.

Pleasures of Making Improvements.

I am over eighty years of age and have lived on the farm all the days of my life. The AMERICAN AGRICULTURIST has been a steady household companion in our family for a great many years and, aided by its instruction and advice, I have, as a rule, been successful. Not only every man that has a farm or garden, but every man that has a family should have the AMERICAN AGRICULTURIST for a household companion. If any one thing could make it desirable for me to live forty years of my life over again, it would be to make still greater improvements in my farm work every year with the aid of the "grand old AMERICAN AGRICULTURIST."

ALBERT LIVEZEY, Bucks, Co., Pa.

A Greeting from the Tropics.

As the AMERICAN AGRICULTURIST has attained its semi-centennial it affords me pleasure to express in the name of the Colombian farmers my heartiest congratulations in common with those of all its other readers. All the world admires the wonderful prosperity of the United States of America. This prosperity and material wealth are, in my opinion, due to the growth of agriculture and to the interest which the people

and government have taken therein. But it must be admitted that the press has aided greatly in producing these gratifying results.

In Colombia great progress has been made in stock-raising. We have Durham cattle, Merino, Southdown, Shropshire and other sheep, Berkshire and American hogs, Brahma, Cochin-china and other fowls. Of all these breeds we have produced as good specimens as any other country. But in tillage much remains to be done. The use of manures is almost unknown here, and in few places is the ground well tilled. Nearly all our farmers lack that scientific knowledge which is the basis of their calling. Moreover, agricultural publications are not as much read as they should be. The wheat and potatoes that we grow are costly. The sugar, as well as the cocoa, which we raise also cost too much. On this account we are unable to export these products, although our climate and extensive territory are well adapted for their cultivation. Some sugar and plows are even imported from the United States. We raise and export the best coffee, indigo and bananas. The latter fruit yields a large profit and will, in due course, be raised on vast tracts of land that are now covered by virgin forests.

Such is the condition of agriculture at present in Colombia. But backward as we are, we tender a hearty greeting to the American farmers, the American press, and the AMERICAN AGRICULTURIST on the semi-centennial of its publication.

C. MICHELSEN, Chief of the National Department of Agriculture, Bogota, Colombia.

Cocoanut Plantations of Jamaica.

The cocoanut is the most important tree on the island, and is grown from the seashore to the foothills. It receives little or no attention, yet bears from 150 to 500 nuts when full grown. Cocoanut groves are scattered along the coast of the island from end to end, and present a magnificent spectacle from the Caribbean Sea, their long feathery plumes being conspicuous objects ashore as they sough in every breeze. The largest cocoanut plantation in the world is said to be that near Port Maria, which is estimated to contain over 300,000 trees. The government owns a beautiful cocoanut plantation at Port Royal, and the heirs of Governor Darling own one other at Darlingford, near the town of Manchioneal, famous as the scenes of some of the adventures of "Tom Cringle," as recorded inhis "Log."

I have not been able to get any reliable data as to the number of cocoanut trees on the island, but, judging from what I have seen and heard, I should think a million would not be too wild a guess. As trees rent for a dollar a year, it is evident that growing them must be a profitable enterprise. The Boston Fruit Company has several large plantations, one near Port Antonio, being two miles and a half in length. I went through this in a carriage, and was both surprised and delighted, it being my ideal of a tropical scene. The trees were forty feet apart, and had bananas planted between them. I inquired if the grove was ever cultivated, and learned that ditches were plowed beside the bananas to lead the water away from their roots, and that the cocoanuts received an occasional dose of cottonseed meal and salt. They were, however, as a rule, let severely alone, except where weeds threatened to choke them to death. I had supposed that these trees only grew near the seashore, and was, therefore, surprised to see them crowning the highest hills and thriving as well as if their roots were daily laved by the ocean.

Cocoanuts are worth from $1.25 to $1.50 per hundred wholesale, and twenty-five cents a dozen retail in the markets of Kingston. Nuts in the green or milky state often sell as high as four cents, but the average price is about two cents. This milk has rather a pleasant flavor, but it is dangerous for persons not accustomed to it to drink much at first.

J. M. MURPHY, Kingston, Jamaica, W. I.

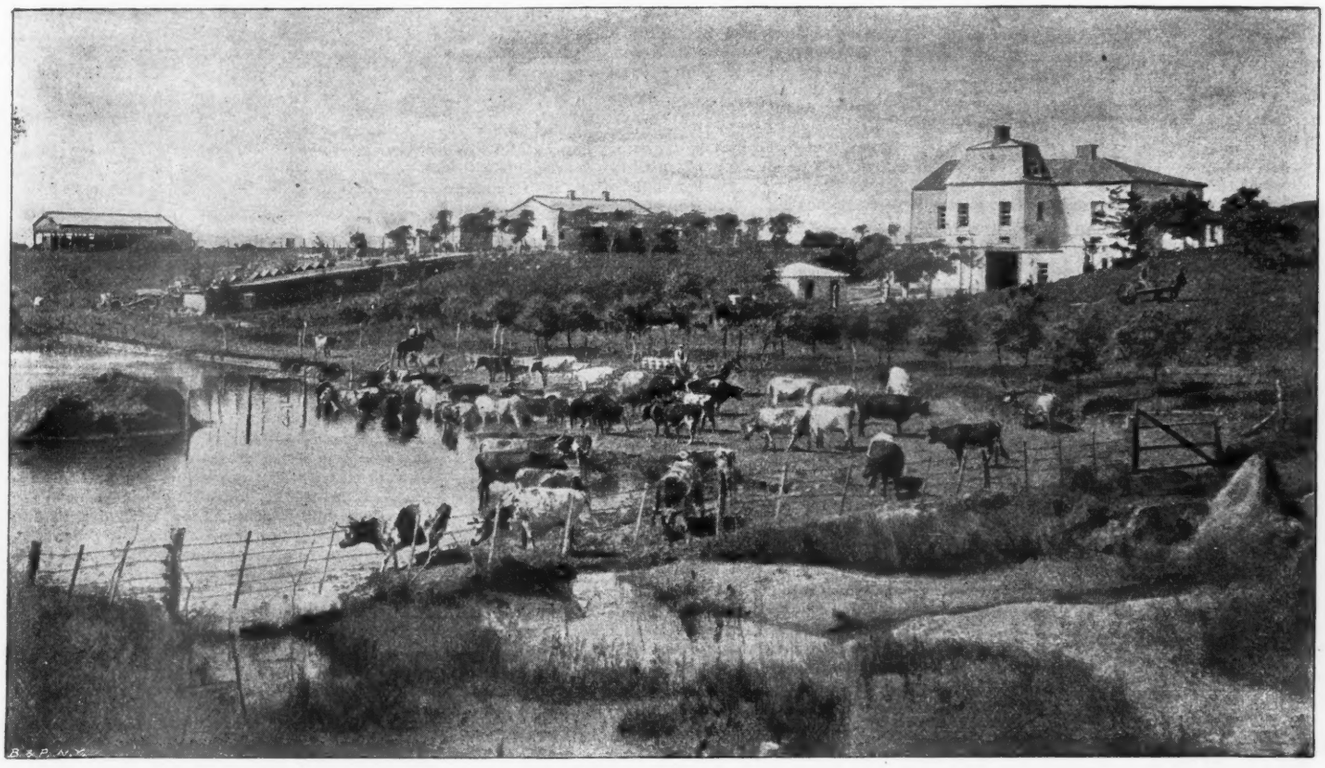
Agriculture of Spain.

The plane of agriculture in Spain is low, and far behind that of all Christendom. As a rule, the domestic animals are poor, miserable scrubs. Breeding is at the lowest stage. The cows give but little milk, and from it neither butter nor cheese is made. The beef is poor, mutton bad, and pork worse. The horses, mules, and asses have degenerated lamentably. Ignorance and poverty are twin-born in all the lower families of Spain. The spirit of freedom has left the breast of the once proud and noble Spaniard. The agricultural people have no ambition, no thrift, no hope of improvement for the future. The gloom of melancholy hangs over the spirit of the Spanish peasantry, and poverty and ignorance stifle the breath of hope. But for the general idleness, the possibilities of Spanish agriculture would be superlatively grand. With such a climate and soil, a succession of fruits and flowers, vegetables and grasses, the land would veritably be "a land flowing with milk and honey." The national trait is exhibited in the care bestowed upon the breeding of bulls for the *Plaza*. The very worst qualities are sought to be perpetuated—fierceness. Every other consideration is banished. The dam that will not turn upon the horseman is deemed unworthy to bear a bull for the *arena*. The *attentador* enters a corral of half-wild cows and, by tormenting them with a light goad, selects those cows that turn upon him and show fight, as the only proper dams from which to breed. The approved bull of great mettle and fierceness is selected as the sire suitable to beget bulls capable to destroy men and horses in the *arena*. Until legislation forever banishes from Spain the degrading bull fight, the hope of improvement can never be realized.

A. S. ERICUS, Barcelona, Spain.

Dairying in the Argentine

The development of dairy interests in the River Plate countries is of very recent date. For more than fifty years the so-called creole or native cattle have been crossed with pure Shorthorn bulls from England, but only with reference to beef. The ideal animal is still box-shaped, large and fat;—"beef and beauty" was the object, and it is doubtful whether there are now, in the whole of the Argentine republic, a thousand milch cows—milch cows that would receive entry at an English or American competitive show for milk producers.



THH CARACANA CREAMERY, ARGENTINA, SOUTH AMERICA.

So indifferent are the great cattle breeders of the country to the raising of milch cows that on *estancias*, where from five to fifteen thousand head of cattle are kept, it is rare, indeed, to find milk and butter on the table—unless, as in several instances, the butter is bought from the creamery at Carcaraña (illustration of which is given herewith). This creamery, situated on the bank of the Carcaraña river, was built over seven years ago, and was fitted up with centrifuges and the best modern appliances, bought especially for it in the States. Butter and cheese are made, and both find a ready sale, though the growth of the dairy business is so slow, as a necessity of the existing conditions, that oleomargarine has already made its way all over the country, and it is generally found in all hotels, restaurants and private houses. Indeed, it is advertised as "this exquisite butter," and none so bold as to say it nay!

The Carcaraña creamery has a capacity of about eight tons of milk per day. The proprietors own some two thousand acres of land in the vicinity

of the creamery, stocked with over one thousand head of cows, nearly two hundred being grade Jerseys. There are five full bred Jersey bulls and twenty-five pure Jersey cows. The head of the herd is one of the Rioter strain—Rioter X, raised by Col. Dauncey, and imported from England several years ago.

The pasturages are either the wild grasses of the country, which are extremely nutritious, or pasturages of alfalfa, which here grows most luxuriantly. O. C. JAMES, Carcarañia, Argentina.

Farming in New Zealand.

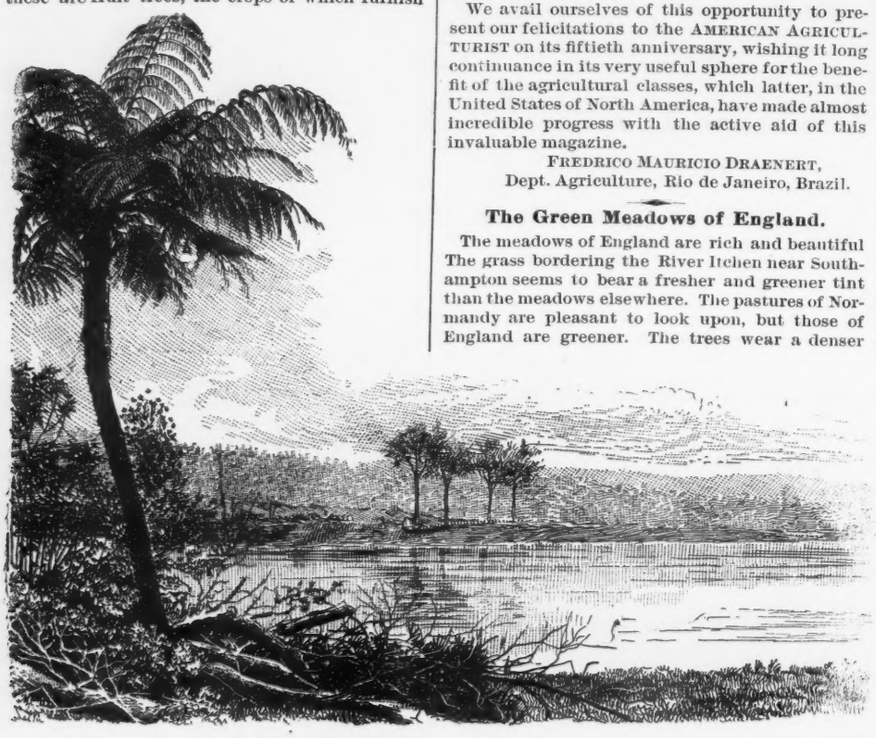
Rich as is the soil of New Zealand, it is no easy task for a man to put the virgin soil into a fit condition for the growing of cultivated crops, on account of the density of the "bush," that almost universally covers the ground. Its luxuriant and intricately tangled growth requires an unusual degree of patience on the part of the pioneer, who attempts to literally carve a smiling farm from its unkempt solitude. Once this is accomplished, the husbandman is well rewarded for his toil. Since this country extends over thirteen degrees of latitude several distinct climatic conditions prevail, according to locality. The South is almost cold, while the North is semi-tropical. The alternate plan of cultivation is the rule, and the chief crops are wheat, oats, barley, and potatoes. Wool-growing, also, is an important industry. The hilly farms are devoted to grazing exclusively, and those of the plains and valleys to the growing of cereals and vegetables. No manures are used or needed. [A bit of river scenery, with a tree fern in the foreground, is seen in the engraving.]

ED. N. LIFFITON, New Zealand.

Care of Country Roads in Germany.

The highways of Germany are built to last forever, and their excellence is not surpassed anywhere. In addition to the main road there is a sidewalk for foot passengers, and another path for horseback riders. All along the sides, trees are planted as soon as the roads are finished. Usually these are fruit trees, the crops of which furnish a part of the income of the men, who take care of the road; or of the toll gatherer. For every vehicle, a small toll is collected for a given distance, except farm wagons which are free. Heavily loaded trucks have to have broad tires on their wheels. The cost of building and maintaining these roads, is not put on the rural population alone, but the cities, desiring to secure the rural traffic, assume the largest share of it. The principal highways are macadamized and are built by the State, which has also the control of them. Along both sides of these roads are ditches banked with turf to carry off the surface water. The droppings of the animals traveling on the roads are gathered regularly, piled up at convenient places, and sold at fixed prices to the neighboring farmers.

W. SELIGER, Mackenburg, Germany.



A NEW ZEALAND RIVER SCENE.

Brazil's Felicitations.

In a country where there are not even two inhabitants (1.67) per square kilometer, progress in the agricultural industry cannot be but very limited. The density of population is the prime factor in determining the extent of agricultural development. In the States of Amazonas, Para, Matta Grosso and Goyaz there exists, as yet, no extensive agriculture. The people avail themselves chiefly of the natural resources by gathering rubber, cacao, sarsaparilla, ipecacuanha, cocoanuts, Para nuts, vanilla and wood extracts. However, there is extensive cultivation of grapes in Goyaz; of tobacco in Goyaz, and in the valley of the Amazon; and of sugar cane in the Matto Grosso and in Para. Extensive husbandry is also carried on in these States, and especially in Para, Matta Grosso and Goyaz, and in general on the vast interior tablelands of nearly all the States, and on the mountains and plains of Minas-Geraes, in which latter State the population is denser, being at the rate 5.25 inhabitants per square kilometer, and the progress is such that milk is produced for the manufacture of well known cheeses—the only native dairy products which are sold in many of the ports of Brazil. High in rank in this industry stand also the States of Piauhy, Parana and Rio Grande do Sul. In these States, particularly in the interior, extensive cultivation and general husbandry were prevalent fifty years ago, and will always remain the principal occupations, on account of the extremely thin population, and the great difficulty in the transportation of farm products. The most important crops are coffee, cacao and tobacco, for which high prices are realized at the sea ports, thus affording fair remuneration to the farmers.

We avail ourselves of this opportunity to present our felicitations to the AMERICAN AGRICULTURIST on its fiftieth anniversary, wishing it long continuance in its very useful sphere for the benefit of the agricultural classes, which latter, in the United States of North America, have made almost incredible progress with the active aid of this invaluable magazine.

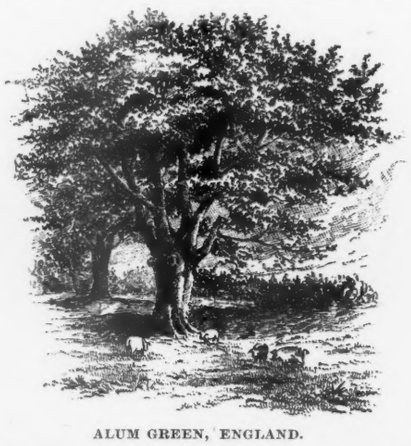
FREDRICO MAURICIO DRAENERT,
Dept. Agriculture, Rio de Janeiro, Brazil.

The Green Meadows of England.

The meadows of England are rich and beautiful The grass bordering the River Itchen near Southampton seems to bear a fresher and greener tint than the meadows elsewhere. The pastures of Normandy are pleasant to look upon, but those of England are greener. The trees wear a denser and brighter foliage, and even the English faces have the color and expression of rugged health. The pure air and moist climate imparts the greenest tints to the meadows, and the healthful out-door life quickens the pulses and brings out the ruddy glow so characteristic of the English people, and so markedly a feature of their faces. There is everywhere the same solid quality about the meadows that are peculiarly English. These meadows have a solid foundation. They are laid down to last. The grasses are numerous, and sown with a generous hand, upon soil fully, freely, and perfectly tilled and enriched. Then, over all, to firm and even, the heavy iron roller makes its strong impression. After this, generous Nature supplies the green tints and the full harvest. The goodly surroundings add beauty to the scene. The farm houses, covered with clinging ivy, and surrounded with hedges, green shade trees and ample fields, in which numerous herds of domestic animals contentedly graze, complete an animated picture of rural life, transcendently beautiful.

"Then to the enamell'd meads
Thou go'st; and as thy foot there treads,
Thou seest a present God-like power
Imprinted in each herb and flower."

Bordering every rill, or rivulet, or stream in England, there is a wealth of green grass and, in most places, every element to form a picture of real rural beauty. Along the banks of the Itchen, the grasses were in full bloom late in October. Elsewhere there is none. The meadows furnish a larger amount of sustenance to animal life than all the generous grain fields. And here on the Itchen the wealth of grass was surpassingly great. Farm, field, and meadow are all enriched and blessed in the happy homes of Hampshire, and all England partakes in large measure of the beauties and solid qualities of substantial contentment. Nowhere is rural life more felicitous than in England. Sturdy oaks, spreading beeches, and the evergreen holly, ornamented with bright red berries glinting and glowing, lavishly beautify park and grove and forest of beautiful England.



ALUM GREEN, ENGLAND.

A. S. HEATH, Southampton, England.

[The charming view of *Alum Green* presented herewith tells its own eloquent story.]

Agricultural Conditions at Queensland

Farming in Queensland is a poor occupation. I have been farming here for twenty-six years, and have not been able to make any headway, although I work hard and live economically. The seasons are very trying. On the 8th of last June I had over one thousand dollars' worth of crops in the field, and on the morning of the 9th the Kolan river was a mile wide, and all crops were submerged—some to a depth of forty feet. Although you Yankees are great at most things, I do not think you ever saw such rain as we had that night; it came down in a solid wall; but, alas! there was no check on the top of it to pay wages or storekeeper. In 1884 I lost eighteen years' hard earnings by drought. Although I owned over three hundred head of cattle and horses before the drought; when it was over I had to hire a team to bring rations to keep us alive.

Our land laws are liberal. A man can select two hundred and sixty acres, at six dollars per acre, and, if he has lived on it five years, and paid the two-sixths, he gets his deeds in fee simple, but there are not ten per cent. who can hold out till they get the deed of grant. I have seen brave men, with true-hearted women, working hand in hand to make a home. Often the noble woman has been left, for months at a time, with a young family, in the lonely bush, while the husband and father has been seeking employment fifty or one hundred miles distant; and I have had to perform the duties of undertaker more than once when the father has been thus from home. Yet the home they fought so hard to make, the fruit trees just coming into bearing, the house they built with

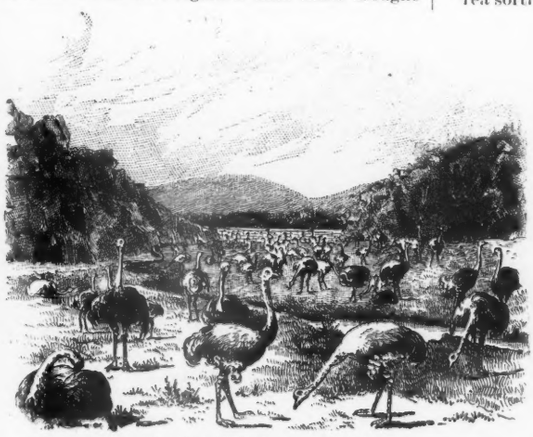
their own hands, and all they had in the world they had to leave, and see become the property of a Christian storekeeper or middleman!

Your advice to farmers, "to be content," is excellent. My advice to them is to stay where they are, else they may jump from the frying-pan into the fire. We are delighted with the AMERICAN AGRICULTURIST, and I notice that our leading periodicals copy largely from it, both reading matter and illustrations.

W. BROTHERTON, Cedar Vale, Queensland.

Ostrich Farming in the Cape Colony.

Ostrich farming is one of the important industries of South Africa, which, as yet, furnishes the bulk of the ostrich plumes for the markets of the world. There are probably 200,000 domesticated ostriches in Cape Colony. Each bird is supposed to net his owner forty dollars per annum. The inclosures in which they are kept are usually built of stone, but where stone is not abundant wire fences have been employed with equal success. The birds are commonly plucked once every eight months, yielding one pound weight of feathers each, but many farmers only pluck sixty feathers at a time, so as not to cause too much irritation and resulting inflammation, which is very injurious to the health of the birds, and lessens the next crop of feathers. The birds, in these large fields, find plenty of food, rarely having to be fed with mealies, beans, lucerne or other cultivated food products. The number of eggs laid varies from eighteen to twenty-four, the male bird usually excavating the nest in some sandy spot, but both birds assisting in the incubation, taking turn about. But it is during this period of incubation that the plumes are at their best, and many of them are utterly spoiled for commercial purposes. Of late years, artificial incubating has been resorted to, and with perfect success, for it has been found that fewer eggs are spoiled by this method, and that the young thus hatched are no less vigorous than those brought



A SOUTH AFRICAN OSTRICH FARM.

up by the birds themselves. The value of feathers exported from Cape Colony during the past thirty years is estimated at over $50,000,000, the total weight being about 1,200 tons.

ANNIE RUSSELL, South Africa.

[In the illustration herewith is presented a view of a South African ostrich farm, located in a valley enclosed by steep, rocky cliffs.]

Historical Spot in the Mediterranean Sea.

One of the most picturesque spots in an exceedingly beautiful district is the Grotte Napoleon, in Ajaccio, Corsica, (a view of which is presented in the accompanying engraving.) It is so called because it is popularly supposed to have been a favorite retreat of Napoleon, when a boy, to study in. The "grotte" is a huge bolder with a recess underneath, just above the Place Casone at the end of the Cours Grandval, known, no doubt, to all those familiar with the island of Corsica. The view to be obtained from the rising ground is lovely in the extreme, more especially at sunset in the autumnal period of the year. Readers of Lears's "Diary of a Landscape Painter" will

GROTTE NAPOLEON, CORSICA.

remember the praise which that writer and lover of nature awarded to the old haunt of Napoleon. Nowadays it receives much less distinguished visitors, being overrun by Corsican youths, who turn the place into a card playing resort.

F. C. CAPPELLA, Ajaccio, Corsica.

Grading Tea in Japan.

Tea sorting is one of the common occupations of young girls in the tea-farming districts of Japan. They carefully pick out all the seeds, weeds, bits of bark, and other rubbish that unavoidably fall into the baskets during the picking. This sorting is done after the tea leaves have been fired; that is, dried by being placed in a tray, with a stout paper bottom, and shaken over a charcoal fire for a time, and then placed on the top of an oven built for the purpose, when the drying operatives twist the leaves by hand. The pickers, besides taking out the rubbish, in many cases sort the leaves into different grades, the better qualities being taken out and sold at very remunerative prices. The Japanese teas are divided into eight grades, but, unfortunately, the best of them are not sent to the United States. After the tea has been dried, and is ready for packing, it is usually sifted, and then carefully packed in lead-lined chests and in caddies. The dust from the sifting is saved, and large quantities of it are sent to America every year. It is sold much cheaper than the perfect tea. This dust only costs from five to ten cents a pound wholesale, and by careful admixture with good tea can be made to retail at a dollar.

JAPANESE GIRLS SORTING TEA.

C. RENTER, Tokio, Japan.

[The lifelike scene represented in our illustration, engraved after a photograph, shows three young girls sorting tea, and conveys better than words the idea of how the work is done.]

Fruit Growing in Northern Africa.

Algeria is rapidly becoming a formidable competitor with the fruit growers of Southern Europe. Two young men, with no knowledge of agriculture, bought an estate of five hundred and eighty-five acres at a place called Bonfarik, which had never paid any of its former owners. It had good soil and a spring of water yielding 1,000 cubic meters per day. This was all laid out in oranges, lemons, and vines. A hundred acres have been planted with oranges, of which thirty-seven acres are productive, and the remainder will be so in four or five years' time. Instead of planting seedlings, a system which has been generally abandoned, the universal method of grafting the desired species on stalks of the *bigarade* was adopted. The young plants remain in the beds where they are sown, or are grafted and transferred to others for four years. They are then planted out in rows, five meters apart, or four hundred plants to the hectare; in five years more they begin to bear fairly, and at ten years they are in their prime. A tree on this estate, thirty-five years of age, bore five thousand five hundred fruits last year.

The plantations are plowed four or five times a year; the trees are manured every five years, and they are well irrigated with running water twice a month during the three hottest summer months. Nothing is grown amongst them, it being found that any other growth would injure them. The trees are sheltered from the wind by means of pyramidal cypresses, placed in double or triple rows all round. Last year the proprietors of this estate sold the produce of this thirty-seven acres of orangery for three years, in advance, for $5,000 per annum. When the orangery and vineyard are in full bearing, the return will amount to about fifteen per cent. C. TEMPLE, Oran, Algeria.

To Free the Hennery from Vermin.—J. M. Fairfax, Fort Wingate, New Mexico, has taken to raising fowls on too large a scale in too small quarters, and finds his hen house filled with vermin. Clean it out thoroughly and whitewash it thoroughly, roosts and all, with whitewash in which crude petroleum, kerosene, or crude carbolic acid is mixed. Wood ashes should be thrown in places and dug up for dust baths for fowls. Give plenty of ventilation and wormy fruit. But fumigation will be the best remedy. Drive out the fowls, set fire to a half pound of flowers of sulphur mixed with kerosene in an iron kettle set on the ground. After two hours throw open the doors and windows.

Clean Harness and Soft.—John Flin, Marshall County, Kansas, desires to know how to keep harness clean and soft. Clean your harness thoroughly with a large coarse piece of woolen cloth moistened with kerosene as often as it becomes dirty. After being out in the rain and mud clean it, and wipe it with a piece of old flannel shirt quilted double. If desired, a little good blacking may be smeared over the wiping flannel. Oil and varnish make the harness dirty and rotten. When you bring in your horses soiled and sweaty, treat them the same way you do the harness and they will last like the harness, a good deal longer. Both treated as advised will keep supple and look well.

The Haas Apple.—C. Fred Boshart, Lewis Co., N. Y., sends us an apple under the name of "Lewis County Queen," which he writes has been grown as "Perry's Red Cheek," "Davenport's Red Cheek," and numerous other names. The specimen was identified by Prof. Van Deman, chief of the United States Division of Pomology as a variety widely grown in the West as Haas. This is described by Downing, (Fruits and Fruit Trees of America) and is said to have originated near the then village of St. Louis, Mo. many years ago, on the farm of Gabriel Cerré. The tree is vigorous and, in the orchard, is of a spreading habit, though young trees in nursery are very straight and erect. It is perfectly hardy in the West and Southwest, and is highly prized there as a fall apple for family use and market. Fruit medium to large, round or oblate, somewhat conic, slightly angular; skin smooth greenish yellow, splashed, striped, and shaded over nearly the whole surface with light and dark red, and a few rather large light dots. Cavity medium, greenish, stalk short, slender, basin medium, shallow, slightly corrugated. Flesh whitish, stained near the skin and sometimes through to the core, tender, juicy, sprightly, slightly vinous, sub-acid; good to very good. Core medium to large, open, short, and ovate, clasping the eye; seeds numerous, short and plump, small and brown. Season, September and October in Ohio. This is well worthy of propagation and planting by those who need a hardy fall apple of good quality in the North. There is a possibility that "Ludwig" of Downing may be another name for this variety, though the season of the latter is given by Downing as November to March.

How to Teach a Horse to Back.—A subscriber who has gone from a mercantile pursuit in New York, has settled in Nebraska to "honestly till the soil." Not having had an early farm education he depends upon the AMERICAN AGRICULTURIST for help. One horse of his team does not back, and he desires to know the best method to teach him this important part of neglected education. As you feel the want of early farm education you must persistently and perseveringly learn by study and practice. And as your horse suffers from a lack of early education, you must kindly, gently and perseveringly teach him. Put a bridle on him, or when in harness with his mate, take them by the head, tell them to back, using a little pressure on the bit, repeat the order—back. The educated—broken—horse will obey with promptness according to his teaching. This example will help to teach the uneducated animal. This teaching must be practiced every day till the horse has perfectly learned his lesson. There is no movement of the horse more important than that of backing promptly, gently and safely. The fleet gaits of the horse are forward, and nature has made them for that purpose. Many of the most serious accidents occur by horses backing wildly and furiously. The man who will permit his horse to rush backward in harness is a bad and unsafe horseman. Old horses can be taught new ways, but it is difficult for them to unlearn bad ways. Animals should be perfectly educated to their business. "Spare the rod and spoil the child" is not applicable to the horse unless it is transpose to spare the whip and make the horse.

Western Bird Cherry.—Subscriber, Santa Fe, N. Mex.: The medium-sized black cherry which you find on tall bushes of from eight to twelve feet high, is the *cerasus demissa*, a species closely allied to the common Bird Cherry (*cerasus Padus*) of Europe. The fruit is produced in long, pendulous racemes, and, while usually black there are red varieties, and some nearly as large as the cultivated Morello, or sour cherry. We agree with you in regard to the value of this Western species of the cherry, and think it worthy of attention on the part of fruit growers in the East, among whom it is almost unknown. It has, however, one serious fault, and that is producing a great number of suckers from its subterranean stems.

Smoked Tongue, Ox or Horse?—A subscriber from Ohio desires to know how to tell a smoked ox tongue from a smoked horse tongue. He writes: "I purchased some smoked tongues that looked so different that I suspect that they are not all ox tongues. Please tell me how to know them apart. I have used the smoothest, and finest looking tongues, and retain the others till I read your statement in the AGRICULTURIST." Tongues differ in size and length according to the size of the ox or cow. Cow's tongues generally are smaller and narrower. The ox tongue is long and narrow at its point, and as the tongue of the ox tribe is a prehensile member, its muscles are better developed. The salted tongue of the horse is much shorter and broader at the tip, and is the smoothest and finest looking. Horse meat is good, yet it cannot compare in excellence to the ox tongue, or to the flesh of the ox tribe. The flesh of the ox is more tender, juicy and more evenly mixed with fat, and also contains more nutriment than that of the horse. A sucking colt and a sucking calf at six or eight weeks old would doubtless be good food, but the quality would differ nevertheless. The great value of horses over cattle can never permit horseflesh to become profitable or popular.

Salt on Onions.—G. W. Buttler, Outgamie Co., Wis.: While salt cannot be considered in the way of a fertilizer for plants, it is often indirectly a great benefit, as it destroys insects, hastens the decomposition of vegetable matter and aids in the retention of moisture in the soil. Salt is also destructive to many species of fungi, rust, smut and mildew, but it must always be applied in small quantities, because destructive to most plants, especially while in their active or growing stages. If applied at the rate of from four to six bushels per acre to your onion land just, previous to sowing the seed, we think it will prove highly beneficial in preventing rust and destroying the larvæ of insects in the ground.

Franchot Apple.—The apple received as "Franchot" from W. L. Pearson, M. D., Schenectady N. Y. is briefly described by Downing as having originated in Otsego Co., N. Y. Dr. Pearson says that cions were brought from France a great many years ago by a Mr. Franchot to Morris, Otsego Co., and that the apple has since been known by his name. He further says of it: "With the exception of a tree at Syracuse and one here, (now dead) I have never heard of the apple. It is an excellent eating apple and a good keeper." W. A. Taylor, Assistant Pomologist, United States Department of Agriculture, describes it as an early winter apple of medium size, oblate, slightly conical, with a stem of medium length in a broad green cavity of medium depth. The basin is large, deep, abrupt, and slightly corrugated, surrounding a closed eye. The surface is smooth, glistening, and oily, light yellow, splashed and striped with two shades of red and marked with medium sized prominent dots. The skin is thick; flesh yellowish white, a little tough but juicy and of a pleasant sub-acid flavor; quality very good. The core is oblate, closed, meeting the eye and containing a few small light brown seeds. The European name, as it is, according to Dr. Pearson, a French variety, is not determined. The fact that it has not been wider disseminated, during the long period since its importation, would seem to indicate that there is some defect in the tree such as lack of productiveness, etc., and, while it is an apple of excellent quality, I would not advise its planting except in an experimental way.

White-Leaved Geraniums.—Fred Strengham, El Paso Co., Col.: We doubt much if there are any pure white or colorless leaved varieties of the geranium in cultivation, but there are a number in which the leaves are variegated; that is, a part of each leaf white, and the other part green. Mountain of Snow and United Italy are old and common varieties of this type, and on these it is not at all unusual for shoots to appear with all the leaves pure white, but when these shoots are removed for making cuttings they either invariably die or some of the leaves show the normal green color before new roots are produced. It would appear from this fact that chloraphyll or the green coloring matter in the cells of the leaf are absolutely necessary to the health and life of the geranium. It may be restricted to a few cells in each leaf, or a few leaves on each plant, but cannot be entirely dispensed with in plants cultivated in the sunlight.

Corn-Cob Manure.—E. E. Monroe, Miami Co., Ohio: Thoroughly decomposed corn cobs are certainly valuable as a fertilizer, but they would not be worth as much as barnyard manure. If you can get such material for the cost of hauling, we would say by all means accept it, and spread it on the land in liberal quantities this fall, and next spring apply ten bushels of lime per acre, and plow under rather shallow. If you have meadows or pasture, use the corn cobs as a topdressing, and leave on the surface, where it will slowly decay. The older and more thoroughly decomposed the cobs, the more value per ton or load.

Is Tar Paper Injurious?—Edwin Fox, Eaton Co., Mich., desires information whether tar felt applied to the stems of apple trees, as a protection against rabbits, will prove injurious. For many years we have used the ordinary tarred building and roofing paper and felt for wrapping the stems of apple, quince and peach trees to protect them against the attacks of borers, but, up to the present hour, we have never discovered that the bark under these wrappings was injured by the tar. We renew these wrappings every two years, and on removing the old ones have always found the bark clean and healthy. We have, however, known healthy trees killed by applying fresh warm coal tar direct to the stems and bark, and probably made paper or felt, with the tar dripping from it, might prove injurious, but no dry paper, or one well cured, can possibly injure your trees, and it will prevent the rabbits gnawing the bark.

Fruits in Arizona.—S. M. Craig, M. D., Apache, Co., Ariz.: While we think it rather doubtful if you can succeed in raising much fruit at an elevation of 7,000 feet, and where a mountain casts its shade until nine or ten o'clock in the morning, still it will not cost much to try a few trees and see how they will succeed. Try a few early ripening plums, apples and cherries. The Morello cherries are the most hardy, and you might try a few Siberian crab apples in the way of variety. If the soil is dry, either irrigate or keep the surface of the soil, about the stems, well covered with some kind of grass as a mulch, and you may have to protect the stems with some kind of rabbit-proof material in winter. If you make the attempt, we will be pleased to hear from you as to results.

Fly in Wheat.—Frank Martin, Cumberland Co., Pa., writes us that "the fly" is doing much damage this fall to wheat in the Cumberland valley. Without any description of the insect, we can only venture to suppose that this refers to the so-called Hessian fly (*Cecidomyia destructor*) which has been more or less a serious pest in wheat fields for more than a hundred years. There is, however, a wheat midge (*Diplosis tritici*) which is often destructive to the wheat plant, and sometimes referred to as "the fly." Presuming, however, that it is the Hessian fly at work in your

wheat fields, we can only say that it is now too late in the season for either remedies or preventives. The only effective remedy or preventive is late sowing of the grain. The first brood of flies appears in August, and remains about the field during nearly the entire month of September, and if sowing is deferred until the very last of the month—in our Northern States—the frosts will kill the flies before the young grain gets above ground. Late sowing is the universal practice of farmers when the fly is about. We will endeavor to comply with your request for a description, and an account of the habits of this pest, before the wheat sowing season comes around again.

Green Peas for Market.—A. W. Morse, Madison Co., N. Y.: Descriptions of the different varieties of peas, with the height to which the vines grow, their season, depth to plant, quantity of seed required per acre, distance apart in the row, and much other information relating to the cultivation of vegetables, can be found in the catalogues of the seedsmen advertizing in the AMERICAN AGRICULTURIST. These catalogues are distributed free to customers. As to the question in regard to the best fertilizers, we may say that you can always rely on stable manure; but, if this cannot be obtained in sufficient quantities, use almost any of the standard fertilizers in the market. Land plaster is an excellent stimulant to sow over the vines when they first appear above ground, but you will need something stronger and better to insure a good crop of peas. A crop of turnips or cabbages may follow the peas.

Keeping Winter Apples.—W. H. Snyder, Licking Co., O.: In constructing a fruit house in Virginia, it would probably be best to have it only one story high, and the walls of brick or stone, and then lined with boards or plank inside, leaving an air space of from four to six inches between the plank and main wall. Such a wall would not only insure the fruit against freezing, but allow of preserving a more equable temperature within. The main points to observe are low temperature, but above freezing, and good ventilation to carry off moisture constantly exhaled from the fruit. The fruit must also be carefully gathered, and all bruised and imperfect specimens discarded, then pack firmly in barrels, leaving the heads out for a few days to allow of sweating, then head up and store under a shed until there is danger of freezing, then roll the barrels into the fruit house. Every barrel should be distinctly marked, and the earliest ripening varieties placed where they can be reached first. The size of the house will, of course, depend upon the quantity of fruit to be stored in it.

Fertilizers for Orange Trees.—A. S. Chapman, Los Angeles Co., Cal., writes us that he has read Mr. Harris's article in the November number of the AMERICAN AGRICULTURIST on "How to Double the Value of Manure" with great interest, particularly as he is an orange grower and deeply interested in the question of nitrates. "No other fertilizer," he writes, "has so nobly responded as the nitrates. Allow me to cite one instance: My crop of oranges on three thousand trees for the spring of 1890 was three hundred and odd boxes, all bearing trees, mind you, but in horrible condition, by reason of the white scab. In March, 1889, I was supplied with a colony of Australian beetles (*Vidalin cardinalis*). By June I saw that I was to be freed from the grip of the white scab, and immediately ordered from a drug company of St. Louis a carload of sulphate of ammonia, there being no nitrate of soda procurable here at that time, to my knowledge. In July, I applied five pounds of the sulphate of ammonia to each tree, and flooded the basins with water. Well, in August and September people wondered why it was that the white scab had not hurt me, for my trees turned from yellow to dark green and made a fall growth, the result of which was that we harvested from these trees in the spring of 1891 ten thousand boxes of oranges." This is an interesting letter. It shows what an earnest man who has faith in the teachings of science will do. The fruit grower who was willing to send to a drug store in St. Louis for a carload of sulphate of ammonia, and pay heavy freight on it, deserved success. He can now get nitrate of soda for less than half what the sulphate of ammonia must have cost him, and nitrogen in the form of nitrate is more available and valuable than in the form of ammonia or organic nitrogenous matter. Nitrate of soda is cheaper in California than it is with us, because the freight from the beds in Chili is less. We should think superphosphate or the phosphoritic guano from Lolos Island could also be had at reasonable rates. We have no doubt that nitrate of soda and phosphates can be used with very great profit by the fruit growers of California. In the hot weather of July, with a moist soil, the ammonia would rapidly be converted into nitrates, and the nitrates would do as much good as if nitrate of soda had been used. But as long as nitrate of soda is the cheaper source of nitrogen, of course it is far better to use it. The dark green color of the leaves is a characteristic effect of the nitrates. Probably, too, the great luxuriance of the leaves greatly helped the Australia beetles to hold the white scab in check. Be this as it may, the two crops from the same orchard, unfertilized crop of 1890, three hundred boxes, fertilized crop of 1891, ten thousand boxes, makes one long for an orange grove of vigorous, luxuriant trees.

The Crosbey Peach.—This is the name now given to the peach described in our last issue under the name of Excelsior. The reason for this change was the fact that there is already a variety under the name of Princes Excelsior which would be apt to lead to confusion. The new name was selected in honor of the originator of the variety—a nurseryman named Crosbey—who lived at Billerica, Mass.

Fertilizers for Potatoes.—The Maine State Agricultural Experiment Station gives the result of an experiment with fertilizers on potatoes made by Mr. O. B. Keene, Aroostook Co., Me. The experiments were made in duplicate. In other words, there were two separate plats without manure of any kind, and two plats each with the same fertilizers. The results were as follows:

	Yield of Potatoes Per Acre.
1. No manure or fertilizer	132 bushels
2. 100 pounds muriate of potash, 150 pounds nitrate of soda	265½ "
3. 500 pounds superphosphate, 100 pounds muriate of potash, 150 pounds nitrate of soda	318 "

It seems probable that 500 pounds of superphosphate per acre is a heavier dressing than the crop needs. The soil, as shown by the result on Plat 2, contained phosphates sufficient to produce 265½ bushels per acre. The addition of the heavy dressing of soluble phosphates produced an increase of only 52½ bushels per acre. Probably 200 pounds would have produced nearly or quite as much, unless larger amounts of nitrate of potash had been used. The cost of the fertilizers on Plat 2, was $5.50 per acre. The increase from the use of the fertilizers was 133½ bushels. As our readers know, it costs very little more to dig a crop of potatoes of 265½ bushels per acre than one of 132 bushels per acre. We have to use a fork over just as much ground in the one case as in the other—and it is lots more fun to dig the good crop than the poor one. The cost of fertilizer for the extra 133½ bushels is about four cents per bushel.

Growing Mistletoe.—Mrs. S., Rockville, Conn.: Seed of the English mistletoe is not offered in our markets. The English mistletoe would not prove hardy in Connecticut, where the winters are too cold and the summers too dry for its requirements. The American mistletoe is an entirely different plant which is very abundant in our Southern States, but not hardy north of Southern New Jersey.

Substitute for Stone.—J. J. D., Province of Quebec, Can., makes a novel and promising suggestion in regard to a substitute for building stone. It is especially applicable to those portions of the West where stone and timber are scarce and where straw and hay are to be had in practically unlimited quantities. The idea is this, straw or hay is pressed as solidly as possible into blocks similar to those used for straw or hay burning stoves. It is then firmly bound with wire so that it may retain its shape. Five sides of the block, thus produced, are then carefully plastered with cement. When this is set the block is turned over and the remaining side is plastered. We now have a solid block of pressed hay coated with cement and ready to be used as a stone block in the construction of a house or other building. The block, thus formed, is to be used precisely as a finished block of artificial stone would be. At first thought, this may not appear feasible, but the more consideration it receives, the more good points appear. The hay or straw can be formed into a very compact solid block amply able to sustain any weight that may come upon it. The cement will give a protection from dampness, if properly applied. Laths, or other suitable strips of wood under the wires, will hold the blocks in shape, according to the usual practice. When the wall is laid up, it should receive another coat of cement upon the outside as an additional protection. When clapboards would be cheaper, the outside could be thus covered in situations where sand is available, and where the freight upon the cement would not be too great. Indeed, the plan is one upon which no practical judgment can be given until the conditions of the locality have been studied. A modification of the idea would be the use of asphalt instead of cement. A building with walls made in this way would certainly be warmer than almost any other that could be imagined.

Cleaning Galvanized Iron Pipe.—U. D. D., Lykens, Pa.: Galvanized iron pipe, after it has been long under ground, is not easily cleaned, unless the deposit within it be soft. Sometimes, by applying a powerful force pump, the dirt may be forced through. In sewer pipes it is the custom with some systems to put a copper ball into the upper end of the pipes, and then send a powerful "flush" or flow of water after it. The flow of water forces the ball forward and carries all obstacles before it. The ball itself is slightly smaller than the base of the pipe. In the oil regions a winged scraper, sometimes called a "godevil," is put into the pipe and forced along by the pump. Men follow along the pipe tracing its course by the noise it makes. When it stops they know an obstruction has been reached. They then dig down and open the pipe at that point. This plan, however, will hardly be safe on two thousand feet of pipe less than an inch in diameter. To those who are thinking of laying pipe for carrying water a word of warning is necessary. Do not put in a pipe that is barely large enough to do the work when all is new and clean. In that case the smallest obstruction becomes a serious matter. It is better to have some surplus capacity. Stoppage, in some cases, means nothing less than taking a whole pipe out of the ground, disconnecting all the joints, and cleaning each length separately. When a pipe has been laid well under ground, in order to be out of the way of frost, this means an expense almost half as great as the first cost. There may be some instances where it is quite as cheap to lay new pipes as to clean the old. Before giving up a case of this kind the force pump should have a thorough trial.

Dutch Bulbs After Flowering.—Miss B. S., Conn.: Hyacinths grown in pots should be given a good chance to perfect their growth of foliage after flowering. They will do best when turned out into open ground after the hard freezing weather is over. As a rule, it is hardly worth while to preserve the old bulbs, as they have spent nearly all their vitality during the forcing process, especially those that have been grown in water.

Treatment of Prairie Soils.—H. W. C., S. Dak.: The reason why prairie soils become less and less productive the longer they are cultivated, is because their fertility is taken up and removed by successive crops. Continuous cropping without the application of fertilizers, will soon exhaust the richest soil ever discovered. Shallow plowing is generally practiced in the first breaking up of prairie lands, for the object is at first merely to cut off the grass just below the crowns, turning only a thin sod, as experience has shown that the wild grasses are killed out quicker by such surface peeling, than if they were turned under deeper, while the expense of plowing is lessened in proportion. But, after the land has been worked a few years, the plow should be put down deeper, not only to bring up fresh and rich soil, but also to enable it to hold a greater amount of moisture, or retain it by what is termed capillary attraction. As a large sponge will absorb and retain more moisture than a small one, so will a deeply worked soil absorb and retain more moisture than a shallow one and still, during wet weather, is more dry than a shallow thin soil. The terms shallow and deep plowing are comparative, for while six inches might be considered deep plowing in some countries and localities, it would be thought very shallow in others.

SCIENCE IN FARMING.

Gleanings, from the Bulletins.

GEORGIA—No. 14, pages 20. In the fertilizers on oats, nitrogen was found to be the most effective element. The cotton seed meal was the only substance that paid a good profit. The Appler variety is the best, being hardy and free from rust. Of wheats, the Fultz made the largest yield, and the Walker a week earlier, and is the most reliable sort one year with another. In testing beans, the largest yield was when a mixture of nitrate of soda and cotton seed meal formed the source of nitrogen. With beets, it was found that the nitrate of soda plats gave a decided gain over the cotton seed meal. The conclusion is reached that, for quick maturing crops, especially those planted in early spring, nitrate of soda should form the source of nitrogen. The nitrate of soda is superior for peas. With cantaloupes, the nitrate of soda showed more vigor and bloomed first, but later the luxuriant growth upon cotton seed meal plats was remarkable. Nitrate of soda is best for earliness, but cotton seed meal increases the yield, greatly, but at the expense of earliness.

KANSAS—No. 21, pages 32. This is the second report upon fungicides for the stinking smut of wheat. With the hot water treatment it was found that the process increased the yield over perfectly healthy grain untreated, but it is undetermined whether the increase is in percentage of germination or in added vigor of the plants. The seed used for the experiments was artificially smutted by placing the grain in a box with smutted seed added, and the whole stirred with a shovel, until the grains were black with smut spores. This was, without further treatment, used for the test plats. It gave from five per cent. to as high as seventy-five per cent. of smutted grain in the plats. The smut was entirely prevented by treating the seed with water at a temperature of 131° F. for fifteen minutes. The temperature must not be allowed to vary much from the standard, and in no case raising above 135° F., or falling below 130° F. As there are two vessels for water used, it is an easy matter, by dipping from one to another, to keep the temperature at the proper point.

KENTUCKY—No. 35, pages 16. In the wheat experiments the Egyptian has made the highest average yield for three years, followed by Hunter's White and German Emperor; that is, about thirty bushels per acre. Under methods of seeding, in some cases broadcasting brought more than drilling, but when a smaller amount of seed was used the difference was in favor of the drilling process. The conclusion from the tests of fertilizers upon wheat is the same as previous years, namely, that whether used singly or in combination they have no effect upon the yield of wheat. Upon the same land for corn, potatoes, hemp, and tobacco, the potash gives favorable results. The Golden Grant oats proved the best out of a large list tested. It is new, and the grain grows entirely upon one side of the stalk.

MICHIGAN—No. 77, pages 6. In comparing the yield of old and new meadows, the following conclusions are obtained: Seasons vary, causing great difference in yield of grass. One of the most striking points is the large yield of the plats sown with a mixture of eight sorts. If these varieties are properly selected, such results of mixtures will almost invariably follow. Whether to keep land in permanent pasture in Michigan will or not depend upon many circumstances, among which are: The risk of having the grasses of the old sod injured by insects, by cold of winter, or drought of summer, and the cost of labor and seed in re-seeding every two or three years. Permanent pasture land accumulates a surplus of nitrogen which is just what is needed for most other crops.

MINNESOTA—No. 18, pages 24. This is a report upon various kinds of fruits in the test grounds. Of strawberries, the Warfield gave the largest yield—7,000 boxes per acre. The matted row, with mulch, system has proved the best, as the plants do not blossom until danger of frosts is past, and the mulch prevents serious injury from drought. It is shown that the pistillate sorts produce more fruit than perfect-flowered varieties, provided they have sufficient pollen furnished them for fertilization. For raspberries, the Marlboro, Hansell, and Cuthbert are recommended, and Ohio and Nemaha among Black Caps. It is an easy matter to grow evergreens from seeds. The greatest danger comes when the plants are young and growing fast. Damping off may be greatly reduced by covering the bed with sand. The best seedbed is a rather dry, sandy leaf mould. The young plants need protection from the sun, and left exposed in cloudy weather. Warm, moist weather is far worse for seedlings than a continuous drought. Sow the seed of hardy evergreens about one inch deep; that is, such hardy, large-seeded sorts as pines and spruces. The buffalo berry is prolific in fruit, highly prized in the drier portions of the Northwest, and will repay culture. The fruit is acid, bright colored, and makes a good jelly.

MISSISSIPPI—No. 16, pages 16. Anything that lowers the vitality is a predisposing cause of glanders, and among these are sudden changes of weather, bad ventilation, impure water and food. The exciting cause is a germ or specific organism, the *Bacillus mallie*, discovered in 1882. It occurs naturally in the horse, but may be transmitted by inoculation to man, sheep, goats, dogs, and cats. The chief source of danger is in handling the mucus flowing from the horse's nose. The sources of infection are feed boxes and watering places, as there the germs longest retain their vitality, and horses are most likely to come in contact with them. No medical treatment is recommended. It is more than doubtful if any cases entirely recover. The cost of treatment outweighs the value of the so called recovered cases. The matter of disinfection is one of great importance. Slaughter and burn, or bury, all diseased animals, and then disinfect. All "exposed" cases should be quarantined until the period of danger is past.

NEW JERSEY—No. 82, pages 40. The terrible insect pest known as the rose-chafer or "rose bug" receives full treatment with many illustrations. The history, food habits, mouth parts, habits of the beetle, date of appearance, egg-laying habits, the larvæ, breeding grounds, and remedies are the principal subjects treated. A study of the minute anatomy of the pest shows that it has extremely small openings for breathing, defended by fine hairs which sift out all that might prove injurious to health. The organs of taste are feebly developed, and nothing has been found that the insect will not eat, from tobacco to copper or arsenic. Under the head of experiments, arsenites, copper mixtures, pyrethrum, kerosene, lime, tobacco, acetic acid, quassia, digitalis, corrosive sublimate, muriate of ammonia, cyanide of potassium, odorless insecticides, slugicide, kainit, alum, and hot water have all been tested. Counter attractives, bagging of grapes, and mechanical devices have all been employed. The following suggestions for practice are made: Prevent the breeding of the insects by using the heaviest land only for grass, and keeping the least possible light land in sod. Thoroughly cultivate the land in May and late in fall or early in spring plow and topdress with kainit. Vineyards in particular should be deeply cultivated in May. Plant a few rows of blackberries around vineyards to attract the first beetles. Collect the insects daily, at least, using some device like those shown in the bulletin. Hot water, while effective, is not easily used and not cheap. If the vineyard is small and insects few, a row of spiræas near the vines may attract the beetles and save the grapes.

NORTH CAROLINA—No. 79, pages 24. In this bulletin of information on scientific matters, in plain language for unscientific readers, the following, among other topics, are treated: the air, soil, water, plants, when plants get food; how they get it from the air, and the soil; how plants construct their stems, branches and roots; what food plants get from the soil; what is manure; farming *vs.* planting; rotation of crops; sources of fertilizing elements, as potash, phosphoric acid, nitrogen, lime, etc.

NEW YORK—(Cornell) No. 32, pages 50. Nitrate of soda, while an incomplete fertilizer, is useful for producing early crops of tomatoes. Upon poor soil it is of little use when employed alone. Very early setting of tomato plants upon well prepared soil is advocated. The plants should be strong and stocky. Two transplantings gave better results than three, but much depends upon condition of plants, age, and the way they are handled. Seedlings are better than cuttings. Trimming, during July and August, appears beneficial, and single stem training of tomatoes gave twice as much yield as ordinary culture, earlier fruit and less injury from the rot. There is no advantage in hilling, and "leggy" plants, while producing a fair crop, are not so productive as stocky ones. There is no gain from selecting seeds from first ripe fruits. Upright and open training decreases rot, and allows more easily the application of a fungicide, if necessary to use it. As varieties depart from their unimproved types, they lose in keeping quality. It is not associated with shipping quality. Crosses between yellow and red tomatoes uniformly gave red fruit as also between purple and red. The foliage of this cross may be intermediate. Tomatoes mix in the field, and hybrids with the currant type may appear spontaneously. Tomatoes run out; even the best of ten years ago are not true to name now.

OHIO—No. 6, pages 20, with several illustrations. The summary of the tests with small fruits is as follows: Blossoms of perfect flowered strawberries are more easily killed by frost than those having imperfect flowers. Haverland, Crescent, and Warfield are the three most reliable fully tested sorts. Gandy, Pearl, and Miner are good for pollen. The following raspberries are recommended: Gregg, Ohio, Hilborn, and Palmer. Smith's Prolific rusts badly. The best blackberries are Snyder, Briton, and Agawam. The raspberry scab, or anthracnose, is prevented by using copper sulphate, four pounds; lime, four pounds; water, fifty gallons. Four applications should be made during the season, the first before growth has commenced in the spring, and the last just before the time of blooming. The copper carbonate is nearly as effective. A description with plates is given of the raspberry anthracnose, red rust, and other diseases of the raspberry and blackberry.

PENNSYLVANIA—No. 17, pages 20. The value of cotton seed meal is compared with bran for the production of butter. The health of the cow was not affected by feeding six pounds of cotton seed meal, daily, but the health of calves was injured seriously with one pound. The yield of milk was increased about a fifth by the cotton seed meal, and the per cent of fat in the milk was not materially changed. The butter fat was therefore increased by feeding the cotton seed meal in place of bran. The butter from cotton seed meal was rated appreciably lower by New York commission merchants than that from cows with which the bran replaced the cotton seed. The average per cent. of fat was the same in both cotton seed meal and bran butter, while the melting point of the bran butter was 93° F. that of the cotton seed meal butter was 99° F.

TEXAS—No. 15, pages 16. From the influence of climate upon the composition of corn it is concluded that the albuminoids and fat decrease in the New York grown samples, while Kansas and Kentucky corn grown in New York increase their albuminoids over the same corn grown in Georgia. The experiments indicate as a whole that Southern-grown corns are richer in albuminoids and fats with a decrease of the less important ingredients. Cottonseed hulls have proved to be a great economical food for fattening purposes.

UTAH—No. 8, pages 16. From this bulletin upon ensilage, the following conclusions may be derived: The silo is a very costly system of storing crops; mature fodder corn as now packed, is subject to great loss in the silo, and that cutting at an early period cannot be afforded on account of diminished yield. The loss of fodder is far greater than by dry storage in Utah. Air dry fodder corn is more palatable than ensilage, and pound for pound is more effective when fed to steers or sheep than corn ensilage. Animals fed upon silage are more watery in composition than those given dry fodder, and ensilage-fed steers have less fat than those fed upon fodder corn. Lucerne ensilage was less valuable than fodder corn ensilage. Green foods do not seem to be eaten with the relative relish that they are in moister sections of the country. The silo does not seem to be desirable for the dry harvest climate of Utah.

VERMONT—No. 26, pages 24. Maple-sugar making receives a full treatment, and it is shown that an accurate thermometer is the best guide as to the handling of syrup in the pan. Fresh sap boils at 213°, but, as it grows thicker, the temperature must rise to 240°, or even 245°. Pure syrup at 230° tests 80°, and at 253° it would be 90°, a degree being a per cent. of sugar. The syrup naturally contains mineral matter, and, toward the close of the season, some glucose. At the beginning of the season the impurities are one-sixteenth the whole amount of sugar and these may increase, until the last run contains thirty per cent. The more the impurities the higher the temperature of boiling point. The last run cannot be made into a sugar testing 80°, and 90° sugar can be made only from the runs of the first half of the season.

FARMING IN FOREIGN LANDS.

In Greece 155,000 tons of currants are grown, on an average, every year.

The year 1889 brought the largest income to the Danish dories. The average price was $24.70 per cwt.

In Switzerland the first sugar factory is being erected at Romanshorn, upon a German model.

It is stated that in some of the English agricultural districts, the population has decreased forty per cent since the last census.

In 1889 Russia imported nearly $5,000,000 worth of spirits or drinks. This year she could humanely import $100,000,000 worth of food products.

A national mark for Danish butter will shortly be introduced, complaints having been made that butter from other countries is bought as Danish.

The motive power of falling water is to be made a government monopoly in Switzerland. Extensive inquiries are now being made for the purpose of arranging the tax.

Encouraging reports are received of the raisin growing of Mooroopna. Large orders are being received from abroad for dessert pudding raisins. Wine is also becoming an encouraging agricultural industry.

Canada makes a refund on wheat, Indian corn, peas, barley, rye, and (if for export) oats, which may be carried through the Welland canal and the St. Lawrence canals to Montreal or any part east of Montreal.

Germany charges *ad valorem* duties only on railway cars we send. Of the nearly 90,000 horses imported by Germany, America only supplied ninety-seven, but the quality was first-class, and so were the prices.

In Guatemala, modern agricultural implements must, as elsewhere, settle the labor question in favor of humanity. Let intelligence guide, and physical labor be performed by machine work without human suffering.

Three companies have been formed in London to work the petroleum beds of Peru. It is to be hoped that success will attend their operations, as kerosene sells at about a dollar per gallon in many of the Central American States.

Spain is ready and willing to exchange her wine, olives, olive oil, cork, liquorice root, liquorice paste, goat skins, rugs, figs, brandy, canary seed, copperous ore, fining earth, lead, paintings, raisins, soap, etc., for our horns, pork, lard, canned meats, etc.

Cattle raising in Colombia, Central America, is an almost universal industry, but it lacks the proper and perfect utilization of the products, the hides and horns being exported. The hungry people of Europe could consume profitably the meat, if properly canned.

The *Hydatid* disease of New South Wales is very common among dogs. When the eggs of these worms enter the human stomach with the food, they produce the bladder worms. It is necessary that our animals should be kept in a healthy condition to maintain good human health.

Prices for thoroughbred rams did not range so high last year in Australia as they did the previous year. At a recent sale at Adelaide, South Australia, the highest price paid was about $840 for a two-year-old ram, while another went at about $520, the rest making prices from $390 down to $30.

Last year's Bulgarian wheat harvest has been estimated at 39,000,000 bushels, of which 18,000,000 bushels will be available for exportation. The provinces of Roumania and Albania also had good crops, and the Asiatic provinces of Turkey had a heavy yield, much spoiled, however, by harvest rains.

The area under jute in India, in 1891, is reported to be about eighteen per cent. less than in the previous year. The quantity exported in 1890 was 10,606,145 hundred weight, and it appears likely that the quantity from the 1891 crop, available for export, will not be more than three-fourths of that quantity.

There is considerable alarm in political and scientific circles in France in reference to the marked decrease in population. This alarm extends to some extent all through Europe, but elsewhere the concern is from American emigration. The root of the whole evil may lie in the enormous standing armies.

The wines of France were worth $20,000,000 in 1890 over those of 1889. It is a gratifying fact that American wines are becoming better, and larger in quantity as our people follow the experts of France. Wine, like every agricultural product, requires the refinement of care and perfection of knowledge in its production.

An enterprise of widespread importance is about to be set on foot at Tonning, Holland. Cattle will be bought in America and sold by auction after the usual quarantine period. The business will be divided into one hundred shares, only five of which may be held by one individual, so that the risk is not great.

Australian sheep seem to find favor in South Africa. About forty rams sent to Cape Colony, not long ago, from Victoria, Australia, averaged $140 per head, the highest price being $270. A Tasmanian ram at the same sale brought $750. The expense of transportation was $35 for each sheep. Why could not our American breeders build up an extensive trade with South Africa?

The cotton crops of the several parts of Russia are reported as not giving perfect satisfaction. The Industrial Trading Society and the great Yorslow Manufacturing Company, ordered from America, 108,000 pounds of cotton seed and sixteen gins, the seed being distributed among the planters free of cost. This is a good, practical way to introduce any new industry.

At a recent meeting of Lincolnshire, England, sheep breeders, held at Lincoln, it was unanimously resolved that an association should be formed for the commencement of a Lincoln Long Wool flock book. All the gentlemen, present at the meeting, desired that their names might be put down as members, and other breeders have since been invited to join the association.

The Bengal rice crop (winter crop), sown in April and May, is subject to many accidents—want of early rain and damage from later floods. In October the crop blossoms, and requires then favorable weather. Locusts only caused damage in Morbhoom. There was a large increase of acreage in 1891. In Lower Burmah the crop was promising, but the acreage was less extensive.

The French septennial average of wheat production, including 1891, is returned at the equivalent of 299,202,836 English bushels, and the average yield of rye, which includes meteil, at 79,480,000 bushels. Food wants are put at 340,000,000 bushels of wheat, and 80,000,000 bushels of rye and meteil. Last year's crops are given at 232,401,181 bushels of wheat and 71,000,000 bushels of rye and meteil.

Many merchants of Bologna, Italy, dealing in salted provisions, are alarmed by the recent official decree cancelling a previous law which forbade the importation into Italy of American salt pork. These merchants, together with the Chamber of Commerce, have appointed a delegation to ask the Government to protect the National Commerce by levying a heavy duty on American products.

In Silesia, Germany, the "head association of farmers," which was founded in 1890 by Agricultural Councilor Poder, and which confines itself to the sale of feedstuffs, artificial manure, seed, corn, etc., made, during the first year, ending July 1, 1891, sales to the amount of $437,500, with a net profit of $3,500. A considerable reduction in the price of superphosphates has been brought about by the exertions of the association.

In India, there are three classes who cultivate the soil: 1, the Drones, or Brahmins; 2, (Dadnee) Chamor slaves; and 3, the actual tillers, Kachies, Koobies, Ahirs and Gorrarias. The Brahmins are the largest owners, but they own the fewest cattle, so they are compelled to depend upon the poorer classes to plow their fields. Honest labor, to the Brahmins, means degradation, so that agricultural work is only performed in a half-hearted way, and with poor farming implements.

The past agricultural season was a very prosperous one all over the north of China. Never have such fine crops been seen, and, were it not for the loss of life, the surplus produce would compensate for the devastation caused by the floods of 1890. Land that is covered for six months by water from the mountains, receives a precious covering of new soil, as in Egypt, and the alkali, which hinders the fertility of the low plains of China is diluted and washed out by these copious inundations.

From a tabulated list of agricultural implements being introduced into India, there seems to be a hopeful future for that country. But from the report of the Director of the Agricultural Department, Bombay, there does not appear to be a demand for American implements. He says that though in great favor, only a small number have been sold, and few additional ones hired out during the year, partly because the cane area has diminished near the city of Poona by prohibition on sanitary grounds.

From Sofia, Bulgaria, we learn that the first Agricultural and Industrial Exhibition ever held in that country will take place at Philippolis on September 18, 1892, remaining open until November 12th of that year. The exhibits which foreigners may be desirous of sending, must consist exclusively of such machines, instruments, apparatus, and models as are used in agricultural and rural pursuits and in other industries. Great preparations are already being made for the erection of the exhibition building.

The cultivation of the Liquorice plant is being encouraged in New South Wales. It is profitably grown in the south of Europe, and it may be profitably grown in the south of the United States, where there is a rich, deep, sandy loam, with a small amount of manure. It requires but little cultivation, and but little skill to make the extract, and it is so extensively used that it would find an ample home market. It is extensively used in medicinal compounds, in beer, tobacco, confections, and many other ways.

The manufacture of wood pulp has become one of the most important trades of Sweden. According to recent reports, that country has over 120 wood pulp factories, about half of which have been started during the last three years. The export of this product, which, in 1872, only amounted to 114,000 hundred weight, amounted in 1889 to nearly 1,000,000 hundred weight. Although prices have been constantly declining, most of the factories still make a good profit by using the newest and best methods, thereby reducing the working cost.

The Strawsonizer, an English machine for the pneumatic distribution of dust or spray for the destruction of germs and insects and for applying liquid or powdered fertilizers, has been widely advertised in England. But up to October 1, 1891, less than 200 machines had been sold by the limited liability company which was organized in May, 1889, with an enormous capital to push its sale. The company paid the inventors $125,000 for the patent, and the stockholders are now complaining because, besides getting no dividends, the directors' fees have amounted to over $4,000 a year. Several efforts have been made to introduce this machine in the United States, but our manufacturers have, so far, fought shy of it.

Bamboo makes the best kind and quality of charcoal for blacksmith work. It is said to give off more heat than the best coke and requires less blast to kindle and burn it. It commands double the price of ordinary charcoal in India. Our charcoal burners can improve the quality of their coal by using, in a modified form, the method employed in bamboo charcoal. This is the method: The stacks, or kilns, are carefully covered with green leaves, and then plastered with wet clay. While the burning is going on, care is taken to exclude air as much as possible without extinguishing the fire. Bamboo, though hollow, has a firm texture and contains a large amount of silica in combination with other salts that improves its quality in working iron, especially in welding.

In Argentina the sugar industry is developing quite favorably. The area of the cane plantations this year is 42,500 acres, which, at the usual rate of production, will yield 1,879,000,000 pounds of cane. The area of cultivation in 1889 was 34,250 acres, and the yield was 1,507,000 pounds of cane. The gross value of the crop this year is estimated at $12,750,000, as compared with $6,165,000 in 1889. There are thirty-six sugar factories representing a capital value of about $20,000,000 in gold. The actual production in 1889 was 77,000,000 pounds, and this year's yield is estimated at 99,000,000 pounds, the value of which, at current prices, will be $27,000,000 paper, as compared with $10,500,000 in 1889. The production of alcohol for 1891 is estimated at 76,500,000 quarts as compared with a yield of 73,758,816 quarts in 1889, but the increase in price will give a return of $4,250,000, as compared with $1,639,084 in 1889. The gross value of the products of the industry for 1891 is estimated, therefore, at $31,250,000, as compared with $12,139,000 in 1889.

ASSOCIATED EFFORT.

The Progress of Co-operation.

The most remarkable phase in the agricultural world during the last half of the past fifty years has been the progress of associated effort in rural communities. Up to 1860 co-operation was but little heard of among the farmers of the United States, though from the earliest times it had been practiced in such homely ways as neighborhood barn raisings, husking bees, and "swopping work."

Soon after the war, in December, 1866, the first attempt to link together the farmers of the North, South, East and West took shape in a projected national organization named the Patrons of Husbandry, to consist of local county, state and national Granges. The hour was ripe for the movement and it made a magnificent growth. It brought together the farmers and their families for social and intellectual intercourse, stimulated confidence in themselves and in each other, and paved the way for a large measure of associated effort in matters of business, politics, and government. Fresh with the success of unparalleled growth, the Grange undertook to establish co-operative stores throughout the country, but the membership was not ready for this form of co-operation. Companies were loosely or illegally organized, most of the stores were operated in disregard of business principles, and widespread failure resulted. The Grange also inaugurated a system of trade discounts whereby the members secured goods at reduced prices for cash by concentrating their orders with certain merchants. This plan worked successfully for a time, effecting enormous savings and permanently reducing prices of implements and manufactured articles.

A few Grange stores that were started on a hardpan basis, and managed with fidelity to business principles, survived the crash and are to-day living monuments of the power of practical co-operation. Most prominent among these is the Johnson County (Kansas) Co-operative Association, which was opened July 27, 1876, with $800 cash capital paid in by sixty members, and now has $100,000 capital held by 700 members, besides a sinking fund of $30,000, a magnificent building costing $50,000, a large stock of merchandise, six branch stores in other towns in the county, and a newspaper. Its sales for the past fifteen years have aggregated $3,000,000, and its net profits (after paying the interest and all expenses) have been $175,000, while its sales for the current year will be upward of $300,000, and its net profits nearly $20,000. The Texas Co-operative Association, chartered two years later, with $250 paid in, now has $80,000 capital, has paid over $200,000 in dividends on purchases, makes sales of $300,000 a year and is helpful to the 129 local stores in Texas, many of the latter, however, being comparatively weak.

Recognizing the failure of the Grange to apply business principles to much of its co-operative effort, another secret organization, the Sovereigns of Industry, became prominent in 1874-8, whose special aim was to foster co-operative distribution. The old idea of selling goods at cost or on credit wrecked most of the Sovereign stores—although a few, organized under these auspices, still exist and are very successful, while the order has ceased to exist. A similar order in Michigan, the Patrons of Industry, which has extended to other States, is now managed on similar lines, and the Grange is discussing practical co-operation more carefully than ever before. The Farmers' Alliance, with its enormous membership and wide ramifications, although as yet more loosely organized than its friends desire, is accomplishing much in co-operative savings to farmers through its state exchanges. The same tendency is noted in its efforts that brought disaster to much Grange co-operation in earlier years, due to the American characteristic of attempting to conduct too large an enterprise on small capital and less experience.

Out of all this effort a definite plan of co-operation on a substantial basis has finally been evolved and is gradually being built up throughout the country. Its corner-stone is the local co-operative corporation to manage a store, or exchange, for furnishing its members supplies at regular retail prices, dividing the net profits (after paying interest and expenses) among the patrons as a dividend on their purchases. In farming towns the society also sells the staple produce of its members. The intention is to have these local corporations take stock in a wholesale society for a State, or group of States, through which the local stores can obtain their goods at the best wholesale terms, thus completing the adaptation of the so-called Rochdale system to the wants of the American people in country and city.

In preparing my book, "How to Co-operate," I have been impressed not only with the entire feasibility of this system, but with the wide extent to which it has been applied in more or less varied forms throughout the country. The Delaware Fruit Exchange, the California Fruit Union and the American Live Stock Commission Company are instances of associated effort that is putting immense sums into producers' pockets. An almost perfect type of a local farmers' exchange is found in the Fruit Growers' Union, a co-operative society in Southern New Jersey, Z. U. Matthews, Secretary. It not only markets its members' produce, but accumulates its capital from its commission merchants' rebates, thus keeping the stock wholly in the farmers' hands, and making it pay for itself. Beginning business in 1884 with $1,500 capital, its merchandise sales are upwards of $150,000 a year, while the produce sold for its members amounts to still more.

Co-operation is not confined to the country, but is making rapid progress in cities. A pure type of a successful society on the Americanized Rochdale system is furnished by the Arlington Co-operative Association, of Massachusetts, which was inaugurated in the humblest possible way by a few mill operatives, in 1884, and now has 1,500 members, nearly $50,000 capital stock, does a business of upwards of $250,000 a year, and after paying expenses, five per cent. on capital and accumulating a reserve fund, returns a dividend on purchases of from seven to nine per cent.; it has three branches exclusive of a coal and wood yard that does an extensive business.

Space forbids extended reference to co-operative creamery cheese factories, fire insurance companies, general farming, and the like, most of which have been considered in the AMERICAN AGRICULTURIST. But certain it is that co-operation has passed through its baptism of fire, and is destined to be a leading influence in the agriculture of the future.

A GROUP OF CO-OPERATORS.

1. The Author of "How to Co-operate." 2. George Dewhirst, Arlington Co-operative Association. 3. H. C. Livermore, Johnson County (Kansas) Co-operative Association. 4. J. S. Rogers, Texas Co-operative Association. 5. Z. U. Matthews, Hammonton Fruit Growers' Union and Co-operative Society.

Proof of its Value.—Thomas H. Angell, manager of the very successful Lyons (Iowa) Co-operative Association, speaks in high terms of "How to Co-operate," and orders twenty-five copies as a starter. He regards it as the most effective and cheapest means of inculcating the true principles and practical details of coöperation among the people. The Lyons Association, its history and methods, are fully described in "How to Co-operate." Its experience is certainly a hopeful one for all co-operators, as it started with a subscription of fifty cents, in 1886, and now does a business of $75,000 a year, effecting large savings for its members. What has been done by this association can be done, on a smaller or larger scale, in every township or city in the land. But the way to do it is to make a start—not be everlastingly talking about co-operationand doing nothing. Too much talk has ruined many a good cause.

Articles of Incorporation.—"I have purchased and perused 'How to Co-operate,' and am more than pleased with it. The book tells everything except giving the articles of incorporation." Thus writes a friend at Fordyce, Ark. The articles of incorporation of any corporation, whether co-operative or joint stock, must be drawn to comply with the law of the State in which the corporation is located and, therefore, no one form will serve for all. The main points of the law on this subject in each State are summarized in the appendix of How to Co-operate, where it appears that in Arkansas the articles of incorporation must be filed with the Secretary of State and with the County Clerk. The best plan will be to consult a local lawyer on this point so as to be sure that the corporation is legally formed in compliance with the local statutes. It is always well to be exceedingly careful when it comes to the final completion of a legal corporation. Have it done exactly right, then there will be no fears of members adding to their liabilities. Moreover, if you are to co-operate at all, you want to do it right from the start.

Women's Co-operative Exchanges may be successfully managed in large cities and towns. As a rule, these exchanges should have two departments—one given up to dainties and substantials, such as cake, pastry, bread, jellies, etc., and the other for ornamental work, from a rolling pin or boot jack to embroidered portiers. Heretofore, the exchanges have been devoted largely to handling bric-a-brac, and could be patronized only by the rich. Homemade provisions are in demand in every town, and at a premium over those made from factories, and in making and handling jellies, jams, pickles, canned goods, salads, etc., in addition to pies, cakes and bread, a large opening may soon be made. As some of these articles are of a perishable nature, an experienced superintendent must have charge of them. From the nature of the goods, the profit on them is necessarily large, and, with careful management, this department will more than pay all expenses of the whole concern. It is quite essential that an experienced person have the control of it, and some one may be hired for this purpose.

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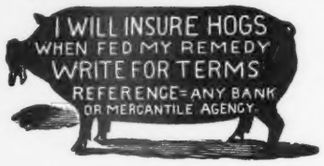

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The Present Situation of American Agriculture.

Its Relation to the World's Food Supply, an Estimate of American Production and Requirements and the Apparently Brilliant Future.

Adapted by the AMERICAN AGRICULTURIST from the work of C. WOOD DAVIS, who has made a special study of the problem in its world-wide bearings.

"Granting the substantial correctness of the data contained in the accompanying Exhibits, the farmer will very soon be by far the most prosperous member of the community, wherever he owns or cultivates lands of average fertility producing the staple food and the fiber crops of the temperate zone." The data on which so remarkable and inspiring a statement are based are certainly worthy of being placed on record in the semi-centennial issue of the AMERICAN AGRICULTURIST, and are here publicly published for the first time.

The acreage required *per capita* to furnish the staples consumed in the United States, and cotton exported, is computed from the acreage and production as set forth in the reports of the Department of Agriculture for the ten years ended with 1890, first deducting the proportion of tobacco and grain—including the secondary form of animals and animal products—exported. This shows that on the average we required *per capita* of wheat 0.48 acres; corn, 1.19; oats, 0.39; hay, 0.64; small grains, etc., barley, rye, buckwheat, potatoes, and tobacco, 0.15; cotton, 0.31 acres; making 3.16 acres as total area cultivated in staple crops required *per capita* for home consumption. With this basis, and knowing from the returns of the Department of Agriculture, the total area in these crops in the United States, Mr. Davis arrives at the following:

Exhibit 1. POPULATION OF THE UNITED STATES, ACRES OF STAPLES IN CULTIVATION AND REQUIRED, AND INDICATING PROBABLE EXTENT OF IMPORTS OF FOOD AFTER 1895.

Quinquennial period....	1885.	1890.	1895.	1900.	1905.	1910.
Population.....	55,700,000	62,500,000	70,000.000	77,000,000	84,000,000	90,000,000
Area of staples required for home consumption.						
Wheat, acres,.....	26,730,000	30,000,000	33,600,000	36,960,000	40,320.000	43,200,000
Corn, acres,.....	66,280,000	74,375,000	83,300,000	91,630,000	99,960,000	107,100,000
Oats, acres,.....	21,720,000	24,375,000	27,300,000	30,030,000	32,760,000	35,100,000
Hay, acres, ...	35,645,000	40,000,000	44,800,000	49,280,000	53,760,000	57,600,000
Small grains, etc.,.....	8,355,000	9,375,000	10,500,000	11,550,000	12,600,000	13,500,000
Cotton, acres,.....	17,267,000	19,375,000	21,700,000	23,870,000	26,040,000	27,900,000
Total, acres,.....	176,000,000	197,500,000	221,200,000	243,300,000	265,400,000	284,400,000
Area cultivated,.....	197,000,000	211,000,000	220,000,000	226,000,000	230,500,000	234,400,000
Surplus acres,.....	21,000,000	13,500,000				
Deficiency, acres,.....			1,200 000	17.300.000	34 900.000	50.000 000
Surplus sustenance for people, number,.....	6,645,000	4,300,000				
Deficiency of food for people, number,.....			380.000	5.475 000	11.080.000	15 820.000
Percentage Increase in						
Population,.....	12.0	12.0	12.0	10.0	9.1	7.1
Cultivated area,.....	19.40	7.10	4.25	2.75	2.00	1.75
Acres per capita of						
Cultivated area,.....	3.52	3.40	3.14	2.94	2.74	2.60

The Most Striking Feature of this calculation is its showing that by 1895 the acres in staple crops will be 1,200,000 less in number than is required to feed our population at the average rate of increase. This deficiency in area is estimated to increase far more rapidly after 1895 than population, both in quantity and per cent., as the table shows. "After 1895 we must either import breadstuffs, cease to export cotton, or lower the standard of living." That his estimates are within bounds Mr. Davis proves by calling attention to the enormous falling off in the rate of increase of cultivated acreage in the five years ended 1890, when the area was only some seven per cent. greater than in 1885, as against an increase of nearly twenty per cent.—three times as much—in the five years ended with 1885. He further confirms this by the reduction in the cultivated area *per capita*, which was only 3.4 acres in 1890, compared with 3.52 acres five years earlier.

This Impending Change appears to be still more likely in view of the following comparison of how the cultivated area in the United States has been developed during a still longer period:

Exhibit 2. INCREASE IN THE UNITED STATES' CULTIVATED AREA.

	'71	'75	'80	'85	'90
Cultivated area, millions of acres.....	93	123	165	197	211
Increase for the period, mil. acres.....	.....	30	40	32	14
Inc. annually each period, mil. acres.....	.....	7.5	8.2	6.4	2.8
Per cent. increase for the period.....	.....	32.2	34.1	19.4	7.1
Per cent. increase annually.....	.....	8.1	6.8	3.9	1.4

The Enormous Increase of cultivated area in the United States that began about 1871 amounted to 112 per cent. in the next fourteen years, while the country's population increased only 44 per cent. during the same time. It was this great spurt and temporary over-production that was a prominent factor in bringing about the recent years of agricultural depression. But the recent falling off in cultivated area, revealed by this table, is equally marked. There is much reason to expect this rate of increase to diminish in a constantly lessening ratio, as Mr. Davis estimates in next to the last line of Exhibit 1.

The Very Significant Fact appears from Exhibit 3 that in but a single year since the harvest of 1884-5 has the current production of wheat equalled the current receipts, and that were the annual harvests as abundant as the great one of 1887-8 such harvests would not now suffice. But we must consider acreage quite as much as the total yield, and therefore pass on to

Exhibit 3. THE WHEAT PRODUCTION AND CONSUMPTION OF THE WORLD DURING THE NINTH DECADE.

[In round millions of bushels, 000,000's omitted.]

Harvest year.	*Production.*	*Consumption.*	*The y'rs surplus.*	*The y'rs deficit.*
1881–2	1,977	2,021	...	44
1882–3	2,263	2,047	216	...
1883–4	2,050	2,073	...	23
1884–5	2,263	2,099	164	...
1885–6	2,077	2,127	...	50
1886–7	2,043	2,154	...	111
1887–8	2,267	2,182	85	...
1888–9	2,183	2,215	...	32
1889–90	2,048	2,245	...	197
1890–1	2,185	2,280	...	95
Totals	21,356	21,443	465	552
Apparent deficit Aug 1, '91				87

Exhibits 3 and 4 show the productive power of the wheat fields of the world to be such as to clearly indicate a present (1891) yearly deficit of upward of 100,000,000 bushels. With no greater rate of increase of acreage than has obtained since 1880, this deficit will annually increase by more than 20,000,000 bushels.

The Reserves Exhausted. — Furthermore, Exhibit 3 shows that reserves of more than 260,000,000 bushels accumulated during the earlier years of the ninth decade have been exhausted. In future, therefore, we must rely upon current production to meet current needs. A large deficit —wholly independent of the deplorable condition of the present (1891) European crops, and due alone to deficient acreage—will be painfully apparent at the end of the 1891-2 harvest year. This will necessitate extraordinary drafts early in 1892 upon India, South America and Australasia, which will fall far short of meeting the pressing needs, while trenching seriously upon supplies that will be as badly needed in the following year.

An Astounding Showing.—Now mark this fact: During the eighth decade the bread-eating populations increased 11.4 per cent., and the wheat area 15.6 per cent., while the rye area was unchanged. But, during the ninth decade, the increase in the wheat and rye area was but 1.4 per cent., as against an increase in the bread-eating population of fourteen per cent. In other words, consumption increased ten times as fast as production during the ninth decade. This showing is astounding. Does it not indicate great scarcity and high prices at an early day?

Exhibit 4. THE WHEAT ACREAGE OF THE WORLD IN 1870, 1880 AND 1890, AVERAGE YIELD PER ACRE, PRODUCTIVE POWER AND REQUIREMENTS.

GEOGRAPHICAL DIVISION.	*Acres in wheat and spelt.* 1870.	*Acres in wheat and spelt.* 1880.	*Acres in wheat and spelt.* 1890.	*Changes during 9th decade in wheat acreage.*	*Yield per acre. Av. of 10 years. Bushels.*	*Acreage of '90 with Av. yield, will give prod. of bushels.*	*Requirements in* 1890. *Bushels.*
Europe.....	93,990,000	93,191,000	94,446,000	1,255,000+	13.0	1,228,000,000	1,465,000,000
United States.....	18,992,000	37,987,000	38,124,000	137,000+	12.1	461,300,000	367,000,000
Canada.....	1,647,000	2,342,000	2,640,000	118,000+	13	34,320,000	30,000,000
India.....	25,000,000	25,812,000	24,983,000	829,000—	10	250,000,000	226,000,000
Australia.....	1,200,000	3,368,000	3,870,000	502,000+	10.2	39,667,000	31,000,000
South America.....	1,250,000	1,800,000	4,395,000	2,595,000+	10	43,950,000	25,000,000
Other Countries....	11,283,000	12,810,000	13,194,000	386,000+	10	131,960,000	136,000,000
Totals and net increase in acreage.....	153,362,000	177,310,000	181,474,000	4,164,000+	12.1	2,189,197,000	2,280,000,000

A Stupendous Change. — Exhibit 4 shows that during the eighth decade the wheat acreage of the world increased 24,000,000 acres, of which the United States contributed 19,000,000 acres, or seventy-nine per cent. But during the ninth decade the increase was but little over 4,000,000 acres, of which the United States contributed only 137,000 acres.

(*Continued on Page* 68.)

Men Who Know

Agree that Catarrh is a Constitutional Disease

And Requires a Constitutional Remedy Like Hood's Sarsaparilla.

Prof. Gross, a leading scientist, argues strongly that "catarrh is a constitutional disease which manifests itself by local symptoms."

Dr. Dio Lewis, the eminent Boston physician, in a magazine article said: "Catarrh is not a disease of a man's nose; it is a disease of the man, showing itself in the nose—a *local* exhibition of a *constitutional* trouble." Therefore, he argues, the use of snuff and other local applications for

Catarrh

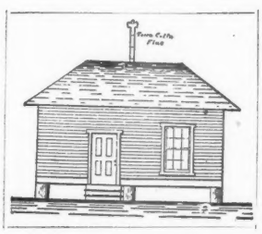
Is wrong, and while they seem to give temporary relief they really do more harm than good. Many others might be quoted to the same effect.

Being a Constitutional Disease, the only proper method of cure for catarrh is to take a constitutional remedy like Hood's Sarsaparilla, which, reaching every part of the body through the blood, does eliminate all impurities and make the whole man healthier. It removes the cause of the trouble and restores the diseased membrane to proper condition. That this is the result is proven by thousands cured of catarrh by taking

Hood's Sarsaparilla

The best blood purifier, the best strength builder, the best nerve helper. Give it a trial

HOOD'S PILLS cure liver ills, constipation, biliousness, jaundice, sick headache, indigestion. Sold by all druggists Price 25 cents.



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completely disguising the taste of the Pill without in any way impairing its efficacy.

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It is ready for use and easily applied by any one.

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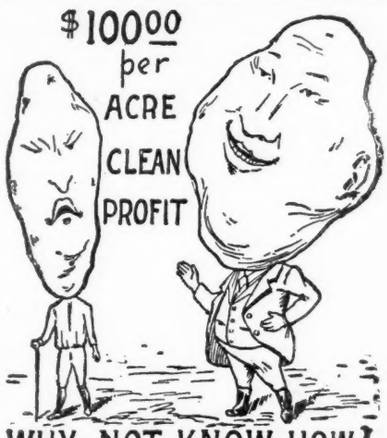

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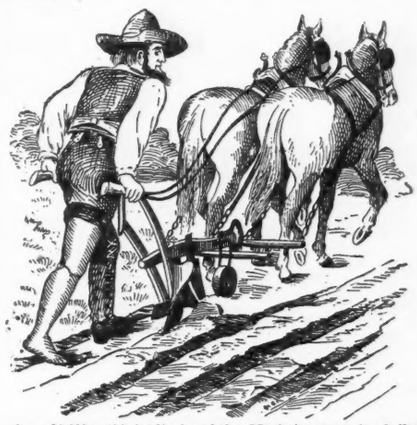

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THE PRESENT SITUATION.

(*Continued from Page* 66.)

Although the last ten years' increase in the acreage indicates an increase in the annual wheat supply of but 50,000,000 bushels, yet the bread-eating populations have increased 56,000,000 in number. These people, therefore, require an addition to the annual supply of more than 260,000,000 bushels of wheat, and 180,000,000 of rye. Yet the rye fields are no greater than ten years ago. Hence, were it not that the excessive wheat acreage, existing during the earlier part of the ninth decade, permitted the accumulation of large reserves of wheat, the pinch of scarcity would long since have been felt.

Exports and Prices.—The course of prices of wheat is most instructive when compared with the development of production in the United States (see Exhibit 2), and with the exports from the three principal wheat surplus countries (see Exhibit 7). The annual average price per bushel of sixty pounds of wheat in England and Chicago, also the annual average value per bushel of wheat exported from the United States, appear in Exhibit 5. There we find that from 1871 to 1889 the *gold* price of English grown wheat, in the markets of Great Britain, shrank forty-seven per cent., as against a fall of thirty-three per cent. in the currency price at Chicago, and thirty-eight per cent. in the value of American wheat exported. So wide a difference in the depreciation is due to the lessened cost of transportation, which benefits the American farmer, while having the opposite effect upon his competitor. The AMERICAN AGRICULTURIST has added to Mr. Davis's Exhibit 7 a fourth column showing the total exports of wheat from India, Russia and America. It shows how the price of wheat has steadily fallen as these exports increased. This point appears most clearly by comparing the average of the three prices given in Exhibit 5, with the total exports from the countries named, as appear in Exhibit 6. It is a common fallacy, however, to regard wheat independently of other grains. Not until the disastrous failure of the Russian rye crops of 1891, has America, or the commercial world at large, recognized this factor in the situation. Here, again, Mr. Davis has, with the utmost diligence, collated all data existing in our own or other countries bearing on the issue. This has been complied with marked care and patience into Exhibits 8, 9, and 10.

Ex. 5. PRICE WHEAT

Year.	Liverpool.	Chicago.	Export.
1871	$1.70	$1.21	$1.46
1872	1.71	1.25	1.36
1873	1.76	1.17	1.43
1874	1.67	1.09	1.14
1875	1.36	.99	1.12
1876	1.39	1.03	1.24
1877	1.60	1.27	1.17
1878	1.39	.97	1.34
1879	1.32	.99	1.07
1880	1.33	1.05	1.24
1881	1.36	1.15	1.11
1882	1.36	1.18	1.19
1883	1.25	1.02	1.13
1884	1.07	.83	1.07
1885	.99	.88	.86
1886	.94	.77	.87
1887	.98	.76	.89
1888	.96	.88	.85
1889	.90	.83	.90

Ex. 6. PRICES & EXPORTS.

Year.	Average Price per bu.	Exports. Million bu.
1871	$1.46	120
1872	1.44	109
1873	1.45	111
1874	1.30	136
1875	1.16	123
1876	1.22	134
1877	1.35	121
1878	1.23	154
1879	1.13	252
1880	1.21	267
1881	1.21	237
1882	1.24	208
1883	1.13	251
1884	.99	235
1885	.91	230
1886	.86	226
1887	.88	247
1888	.89	223
1889	.88	248
1890		242

The Food Supply of the World—In these tables, 8, 9, and 10, we have a sort of birdseye view of the supply of staple foods for the great bread-eating nations of the temperate zones. This information is given for three decades, the whole being a compilation such as no individual or government ever before attempted.

Interpreting Exhibits 8, 9, and 10, Mr. Davis says in part:

It is remarkable that America should ignore the relatively diminishing supply of rye when it constitutes about thirty-eight per cent. of the bread-making grains. During the last twenty years the supply of rye, relatively to population, has shrunken no less then 21.7 per cent.

It is equally remarkable that most writers treat volume of product as the measure of productive power, yet, by reason of the yearly variation in yield, the product can give but a poor indication of comparative productive power, the only reliable measure being acreage which admits of definite and exact comparisons.

Taking the European wheat product for the last ten years, and adding 170,000,000 bushels as the annual imports from other continents, and calling the mean of population 350,000,000, we find Europe has annually consumed an average of 1,393,000,000 bushels of wheat, and that the yearly quota of each unit of the population has been 3.98 bushels.

Exhibit 7. TWENTY YEARS' EXPORTS OF WHEAT FROM INDIA, RUSSIA, AND THE UNITED STATES, INCLUDING FLOUR.

[000's omitted in all the columns.]

Fiscal years ending Mch. 31 Jany. 12 June 30	*Indian exports in bu.*	*Russian exports in bu.*	*Americ'n exports in bu.*	*Total bushels.*
1871	464	57,474	61,574	119,512
1872	1,189	68,651	38,996	108,746
1873	735	58,654	52,015	111,404
1874	3,278	41,437	91,510	136,225
1875	2,004	48,379	72,913	123,296
..Averages..	1,534	54,919	63,402	119,855
1876	4,687	56,752	72,783	134,222
1877	10,428	55,013	55,372	120,813
1878	11,897	51,569	90,168	153,634
1879	1,972	102,836	147,688	252,496
1880	4,109	82,919	180,304	267,332
Averages..	6,619	69,818	109,263	185,700
1881	13,896	36,566	186,322	236,784
1882	37,149	48,973	121,892	208,014
1883	26,495	76,374	147,811	250,680
1884	39,203	83,780	111,534	234,517
1885	29,588	67,726	132,570	229,884
Averages..	29,266	62,684	140,026	231,976
1886	39,329	91,757	94,566	225,652
1887	41,559	51,612	153,805	246,976
1888	25,271	77,796	119,625	222,692
1889	32,875	126,115	88,601	247,591
1890	25,764	107,251	109,430	242,445
Averages..	32,960	90,906	113,205	237,071
Totals.....	351,892	1,391,000	2,129,427	3,872,319

Exhibit 9. THE WHEAT AND RYE ACREAGE OF THE WORLD AT THE CLOSE OF THE NINTH DECADE AND THE ANNUAL AVERAGE PRODUCT FOR TEN YEARS.

[000's omitted in all four columns.]

GEOGRAPHICAL DIVISION.	WHEAT		RYE AND MASLIN	
	Ac's in wheat & spelt.	*Average product of wheat in bush.*	*Acr's in rye and maslin.*	*Average product of rye & maslin.*
France	17,393	310,271	4,693	75,000
Europ'n Rus.*	31,048	240,041	68,494	720,000
Austria-Hun.	9,573	161,722	8,093	120,000
Italy	10,957	118,069	396	4,000
Germany	5,680	93,097	14,367	220,000
Spain	7,059	91,557	3,057	30,000
Great Britain	2,479	79,070	84	2,500
Roumania	3,738	37,796	429	8,000
Europ'n Turk'y	3,890	40,915	1,130	10,000
Belgium	810	18,971	749	18,750
Portugal	560	7,755	900	6,650
Holland	210	5,489	500	12,250
Servia	380	6,033	775	7,000
Denmark	240	4,809	790	17,000
Sweden & Nor.	177	3,695	999	22,000
Switzerland	110	2,041	410	6,000
Greece	142	1,391	10	100
Europ'n totals	94,446	1,222,722	105,876	1,279,250
United States	38,124	439,767	2,365	25,251
India	24,983	253,503	.....	.....
South America	4,395	30,616	1	10
Australasia	3,870	34,482	.....	.....
Canada	2,460	34,980	120	2,000
Other Countri's	13,196	119,608	2	30
World totals...	181,474	2,135,678	108,364	1,306,541

Exhibit 8. THE WORLD'S AREA IN FOOD STAPLES (OF THE TEMPERATE ZONES) IN 1870, 1880 AND 1890: ACREAGE QUOTAS PER CAPITA; PERCENTAGES OF QUOTA INCREASE AND DECREASE, AND ACREAGES ABOVE AND BELOW REQUIREMENTS, AS INDICATED BY MEAN QUOTA FOR TWENTY YEARS AND THAT FOR 1870.

	*Wheat.**	*Rye.†*	*Barley.*	*Oats.*	*Maize.‡*	*Potatoes.*	*Total.*
1870, acres	153,362,000	109,076,000	45,386,000	78,700,000	84,178,000	21,765,000	492,467,000
1880, acres	177,310,000	108,345,000	43,480,000	90,903,000	110,377,000	23,616,000	554,031,000
1890, acres	181,474,000	108,334,000	44,650,000	104,888,000	127,832,000	25,839,000	593,047,000
Per cap. acreage in 1870	0.427	0.304	0.126	0.219	0.235	0.061	1.372
" " " " 1880	0.443	0.271	0.109	0.227	0.276	00.50	1.385
" " " " 1890	0.398	0.238	0.098	0.230	0.280	0.056	1.300
8th decade % inc. and dec. of acreage quota	3.7+	10.9—	13.5—	3.7+	17.4+	3.3—	*a* 0.9+
9th decade do	10.2—	12.2—	10.2—	4.3+	1.4+	5.1—	*b* 6.1—
Ditto for 20 years	6.8—	21.7—	22.2—	5.0+	19.1—	8.2—	*c* 5.2—
Av. per capita acreage for 20 years	0.423	0.271	0.111	0.225	0.264	0.059	1.352
Acreage quota is above or below average, fraction of an acre	0.025—	0.033—	0.013—	0.005+	0.016+	0.003—	0.052—
Acreage above or below requirements as indicated by acreage quotas for 20 years	11,400,000—	15,048,000—	5,928,000—	2,280,000+	7,296,000+	1,368,000—	23,712,000—
Ditto by quotas of 1870.	13,224,000—	30,096,000—	12,768,000 —	5,016 000+	20,520,000—	2,180,000—	32,832,000—

* Wheat includes spelt,—a coarse hardy species of that grain.
† Rye includes maslin,—wheat and rye sown together.
‡ Includes buckwheat, millet, and the small grains.

a. The bread-eating population of 1870 is placed at 359 million and at 400 million ten years later,—an increase of 11.4 per cent, during which time the per capita acreage increased less than one per cent.

b. In the next decade population increased 14 per cent, to 456 millions. But the area in staple crops was over 6 per cent less than at the beginning of the decade.

c. In the 20 years ended 1890 the bread-eating population increased 27 per cent and the *per capita* acreage decreased over 5 per cent.

Exhibit 10. THE GEOGRAPHICAL DIVISION AND ACREAGE DISTRIBUTION AT THE END OF THE THREE DECENNIAL PERIODS OF THE WORLD'S AREA IN GRAIN AND POTATOES, AND THE TOTAL ACREAGE IN EACH STAPLE AND TOTAL IN EACH GEOGRAPHICAL DIVISION.

1870. *At the end of the seventh decade.* **1870.**

ACRES IN	*Europe.*	*United States.*	*Canada.*	*India.*	*Australasia.*	*South America.*	*Other Countries*	*World totals.*
Wheat and spelt	93,990,000	18,992,000	1,647,000	25,000,000	1,200,000	1,250,000	11,283,000	153,362,000
Rye and maslin	107,827,000	1,176,000	67,000	.....	.....	6,000	109,076,000	
Barley	39,393,000	1,109,000	600,000	.....	61,000	20,000	4,203,000	45,386,000
Oats	68,008,000	8,793,000	1,500,000	.....	350,000	.....	49,000	78,700,000
Maize, etc	42,682,000	39,184,000	312,000	.....	142,000	500,000	1,358,000	84,178,000
Potatoes	19,947,000	1,325,000	403,000	.....	80,000	10,000	.....	21,765,000
Total	371,847,000	70,579,000	4,529,000	25,000,000	1,833,000	1,780,000	16,899,000	492,467,000

1880. *At the end of the eighth decade.* **1880.**

ACRES IN	*Europe.*	*United States.*	*Canada.*	*India.*	*Australasia.*	*South America.*	*Other Countries*	*World totals.*
Wheat and spelt	93,191,000	37,987,000	2,342,000	25,812,000	3,368,000	1,800,000	12,810,000	177,310,000
Rye and maslin	106,440,000	1,768,000	135,000	.....	.....	2,000	108,345,000	
Barley	36,381,000	1,843,000	998,000	.....	105,000	30,000	4,123,000	43,480,000
Oats	71,418,000	16,188,000	2,787,000	.....	438,000	.....	72,000	90,903,000
Maize, etc	44,245,000	63,140,000	700,000	.....	169,000	750,000	1,373,000	110,377,000
Potatoes	21,196,000	1,842,000	464,000	.....	99,000	15,000	.....	23,616,000
Total	372,871,000	122,768,000	7,426,000	25,812,000	1,179,000	2,595,000	18,380,000	654,031,000

1890. *At the end of the ninth decade.* **1890.**

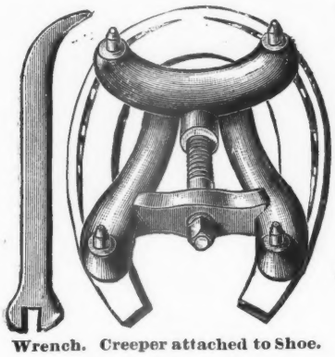
ACRES IN	*Europe.*	*United States.*	*Canada.*	*India.*	*Australasia.*	*South America.*	*Other Countries*	*World totals.*
Wheat and spelt	94,446,000	28,124,000	2,460,000	24,983,000	3,870,000	4,395,000	13,196,000	181,474,000
Rye and maslin	105,876,000	2,365,000	120,000	.....	.....	1,000	2,000	108,364,000
Barley	36,010,000	2,997,000	1,187,000	.....	169,000	77,000	4,210,000	44,650,000
Oats	73,608,000	27,462,000	2,994,000	.....	738,000	6,000	80,000	104,888,000
Maize, etc	43,929,000	79,232,000	900,000	.....	286,000	2,099,000	1,385,000	127,832,000
Potatoes	22,665,000	2,533,000	475,000	.....	127,000	40,000	.....	25,839,000
Total	376,534,000	152,713,000	8,136,000	24,983,000	5,190,000	6,618,000	18,873,000	593,047,000

* See Page 73.

(*Continued on Page* 73.)

"A man works from Sun to Sun,
But a woman's work
Was never done"
Until Gold Dust
came to her ken, And now
She's through before the men.

N. K. FAIRBANK & CO., Sole Manufacturers,
CHICAGO, ST. LOUIS, NEW YORK, PHILADELPHIA, BOSTON,
BALTIMORE, NEW ORLEANS, SAN FRANCISCO,
PORTLAND, ME., PORTLAND, ORE., PITTSBURGH AND MILWAUKEE



Wrench. Creeper attached to Shoe.

The "BLIZZARD" HORSE ICE CREEPER.

Patented July 6, 1880.

The only perfect arrangement for Calking Horses at Home.

MADE IN THREE SIZES:

No. 0, for Nos. 0 and 1 shoes,
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Extra Calks per Set of 16, - - - 20 cents.

Sent by express, charges prepaid on receipt of price.

S. W. KENT, MERIDEN, CT.

Any one can put them on or take them off, or put in new calks.

☞ IN SENDING FOR SINGLE SETS ALWAYS SEND OUTLINE OF FRONT AND HIND SHOE. ☜

Worth more than their price if used only for the purpose of taking your horse safely to the blacksmith shop when the roads are icy. The annexed testimonials have been given after a thorough trial.

From Austin T. Frink, M. D.

Freedom Plains, Dutchess Co., N. Y., December 24, 1890.

DEAR SIR:—Inclosed find twenty cents in stamps for a set of calks. I am using the "Blizzard Horseshoe." Every day or two my neighbors are having their horses shod. For the past two weeks, day and night, my "Blizzards" have been in use and have not worn out the extra set of calks. They are easily adjusted and largely save blacksmith's bills. I have driven my horse on ice as smooth as glass without slipping. No matter how icy the roads are the "Blizzards" work like a charm.

From Emery Busby, Secretary Horse Association.

Hastings, Mich., January 25, 1891.

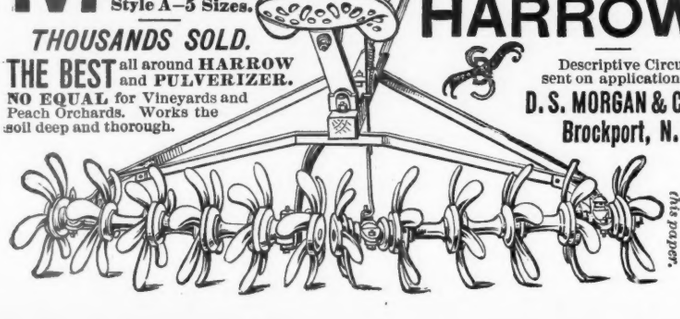
The set I have on my stallion is immense. With the "Blizzard Horse Shoes" on he is showing his heels to all the horses in the city.

FOR SALE BY

C. M. Moseman & Bro., New York; Roberts & Phillips, Philadelphia; S. H. Wilson, Wilmington; J. B. Kendall, Washington; Logan, Gregg & Co., Pittsburg; G. A. Kempel & Co., Akron, O.; G. S. Ellis & Son, Cincinnati; Floyd & Foster, Detroit; J. H. Fenton, Chicago; Shadbolt & Boyd Iron Co., Milwaukee; C. F. Potter, Minneapolis; W. J. Broatch, Omaha; Hubbell & Waterhouse, St. Louis; or by the manufacturer, S. W. Kent, Meriden, Conn.

MORGAN SPADING HARROW

Style A—5 Sizes.



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NO EQUAL for Vineyards and Peach Orchards. Works the soil deep and thorough.

Descriptive Circular sent on application to

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Mention this paper.

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Pays good wages and leads to the highest positions. We teach it quickly and start our graduates in railroad or commercial service. Crops are splendid. Railroads are very busy. Operators are in great demand. **WRITE FOR CIRCULARS.**

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Spring-Tooth Harrows, ALL STEEL
SULKY HAY RAKES
RIDING and WALKING
CULTIVATORS,
TRACTION ENGINES
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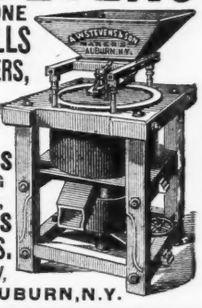

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GREATLY IMPROVED.
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Grinds *12 to 25 Bushels* **per hour.** of **Ear Corn,** dry or damp, **Chop Feed,** and all **small grain,** fine or coarse.

STAR MFG. CO., New Lexington, Ohio.

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Are unequaled for capacity, durability and ease of operating. Every machine is warranted to give Entire Satisfaction or money refunded. Buy no cheap, unwarranted machine, but get the best. You can save 50% in cost of feed, by using our Clover Cutter for your poultry, or our Stalk Cutter for your stock. Circulars free. Agents wanted.

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IDEAL FEED MILL

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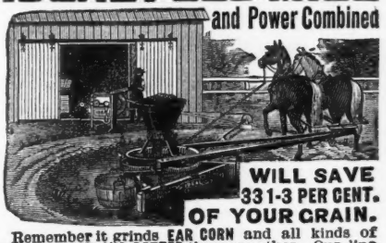

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Will Shell a Bushel of Corn *In 4 Minutes.*

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AGENTS WANTED

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P. O. BOX 120, CHICOPEE FALLS, MASS.

The Largest Manufacturers of Ensilage, Hay, Straw, Stalk and Vegetable Cutters in the World. We also manufacture over ONE HUNDRED different kinds and sizes of Plows.

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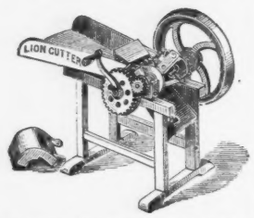

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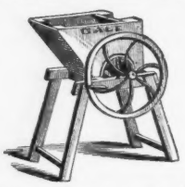

Sizes to cut fine or coarse, suitable for **Cattle or Sheep,** turned by a boy, will easily cut two bushels a minute.

Lowest in Price,
Easiest Worked,
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Durable in Use.

THE YANKEE SWIVEL PLOW.

The Leading Wood Beam Reversible Plow

FOR 1, 2 AND 3 HORSES.

Made of Patented Steeled Metal, with Patent Steel Shifting Lever and Clevis, enabling the Plowman to take any desired width of furrow, without stopping his team.

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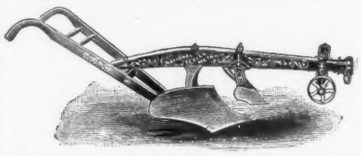

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The only successful Sulky Plow made that will plow stony, rough Side Hill or Level Land.

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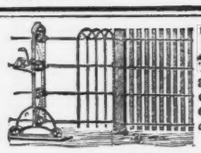

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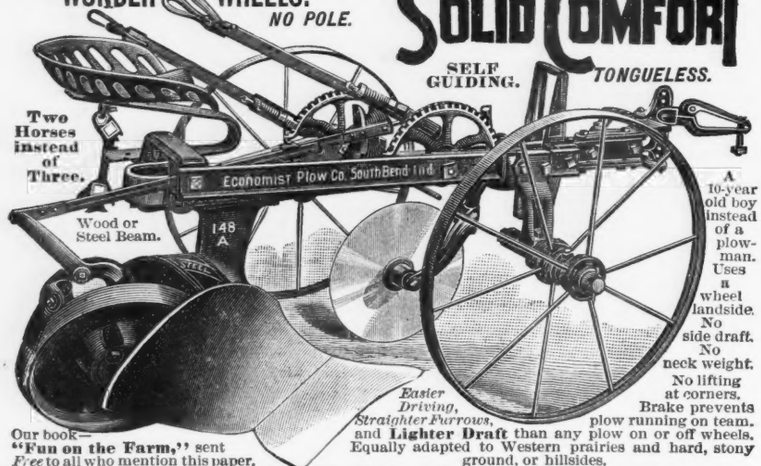

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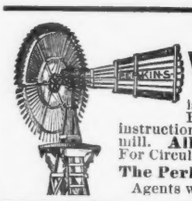

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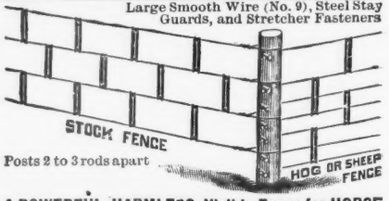

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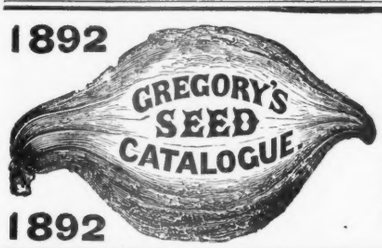

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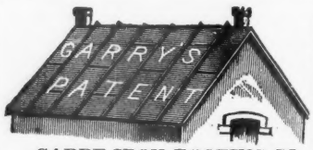

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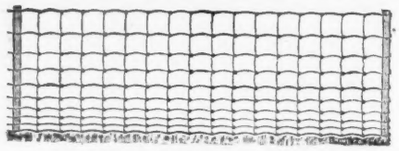

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THE PRESENT SITUATION.

(*Continued from Page* 68.)

In the United States, deducting exports from the official estimates of production, the annual consumption, for all purposes, is found to have been 5.73 bushels *per capita*. The annual consumption of India, for seven years, has been 226,000,000 bushels, and that of Canada and Australia being about six bushels *per capita*, there would appear to be no insuperable difficulty in closely approximating the annual consumption of the bread-eating peoples.

Since 1870, the mean annual acreage of European rye and wheat fields has equalled 0.598 of an acre for each unit of the European population, to which add 0.038 of an acre *per capita* for the acreage employed in growing the bread-stuffs imported, and the yearly consumption has been equal to the product of 0.636 of an acre *per capita*. Hence we are justified in assuming that the bread-eating populations will hereafter require 0.636 of an acre in rye and wheat. The increase of such population having, of late years, been quite 6,000,000 per annum, it is reasonable to expect that the increase in future will be at least 5,000,000 annually. This would necessitate yearly additions of 3,200,000 acres of rye and wheat, which is nearly 3,000,000 acres more than recent additions. (See Exhibit 8).

How Much More Land Must be Cultivated.—Should the *per capita* requirements prove to be as great as in the earlier part of the eighth decade and the rate of increase in population equal that obtaining in recent years, the additions to the rye and wheat area should exceed 4,300,000 acres per annum.

Estimating the increase of population, during the next twenty years, at but 100,000,000, and that each unit will require no more than the 0.636 of an acre, average, of the last twenty years, in rye and wheat, it implies the addition, prior to 1910, of 64,000,000 acres to the world's rye and wheat fields, being more than double the additions of the last twenty years, and one-third more than is now thus employed outside of Europe and the United States.

Where can be found 64,000,000 acres of available rye and wheat lands, and if found, how long will it take to populate and bring them under cultivation? What, in the meantime, will be the price of wheat and rye.

In view of the fact that, during the past twenty years, the net increase of the rye and wheat fields of the world has been but 27,300,000 acres (of which the United States contributed 74.4 per cent.) the addition, before 1910, of 64,000,000 acres does not seem probable, and there are no more poverty-stricken Indias from which it is possible, by excessive exactions, in the form of land (rent) tax, to wring additional contributions of breadstuffs.

Five Conditions must concurrently obtain to ensure a material increase of wheat or rye production: i. e., favorable climate, fertile soil, an unemployed area, sufficient population, and ample means of transportation. In the absence of either, increase will be very slow. But three regions—Australasia, Siberia, and Argentina—meet the first three, and in all the available area is less than that existing in the United States twenty-five years since, and each lacks the needed population and the means of transportation.

To understand how prices were affected by the opening of American areas and compulsory exports from India during the eighth and ninth decades, one has but to examine Exhibits 2, 5, 6, and 7.

While it is possible to increase manufactured articles indefinitely, there is no device whereby the land can be increased, and, under existing climatic conditions, the product of any given area is not likely to increase much, as lands not fertilized are deteriorating, while those being brought under cultivation are of low productive power.

Granting the substantial correctness of the accompanying data, the farmer will, *very soon*, be, by far, the most prosperous member of the community *wherever*, in the world, he owns and cultivates lands of average fertility, producing the staple food, forage and fiber crops of the temperate zones.

*Russia includes Poland and Finland. Great Britain includes Ireland. Turkey includes Bulgaria and Roumelia. In addition to the wheat stated, Germany annually produces about 17,000,000 bushels of spelt, Russia about 10,000,000, and the remainder of Europe about 1,000,000, which goes to swell the annual supply of breadstuffs.

Lecture Course in Agriculture.—The New Jersey State Agricultural College has established a six weeks' lecture course in agriculture, which is designed to teach the general principles which underlie rational farm practice. This course, while primarily intended for farmers' sons, will also be opon to such farmers as may desire to attend. Applicants should be at least sixteen years of age, and have a good common school education. Those desiring to attend, should communicate with Mr. Irving S. Upson, Registrar, New Brunswick, N. J.

Headache

Usually results from a deranged stomach or a sluggish liver. In either case, an aperient is needed. Ayer's Pills, the mildest and most reliable cathartic in use, correct all irregularities of the stomach, liver, and bowels, and, in a brief time, relieve the most distressing headache. These pills are highly recommended by the profession, and the demand for them is universal.

"I have been afflicted, for years, with headache and indigestion, and though I spent nearly a fortune in medicines, I never found any relief until I began to take Ayer's Pills. Six bottles of these Pills completely cured me."—Benjamin Harper, Plymouth, Montserrat, W. I.

"A long sufferer from headache, I was

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two boxes of Ayer's Pills."—Emma Keyes, Hubbardston, Mass.

"For the cure of headache, Ayer's Cathartic Pills are the most efficient medicine I ever used."—Robert K. James, Dorchester, Mass.

"For years I was subject to constipation and nervous headache, caused by derangement of the liver. After taking various remedies, I have become convinced that Ayer's Pills are the best. They never fail to relieve my bilious attacks in a short time; and I am sure my system retains its tone longer after the use of these Pills, than has been the case with any other medicine I have tried."—H. S. Sledge, Weimar, Texas.

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Every Dose Effective.

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Of Roxbury, Mass., Says:

Strange cases cured by my **Medical Discovery** come to me every day. Here is one of Paralysis—Blindness—and the Grip. Now how does my **Medical Discovery** cure all these? I don't know, unless it takes hold of the Hidden Poison that makes all Humor.

VIRGINIA CITY, NEVADA, *Sept. 9th*, 1891.

Donald Kennedy—Dear Sir: I will state my case to you: About nine years ago I was paralyzed in my left side, and the best doctors gave me no relief for two years, and I was advised to try your **Discovery**, which did its duty, and in a few months I was restored to health. About four years ago I became blind in my left eye by a spotted cataract. Last March I was taken with La Grippe, and was confined to my bed for three months. At the end of that time, as in the start, then it struck me that your **Discovery** was the thing for me; so I got a bottle, and before it was half gone I was able to go to my work in the mines. Now in regard to my eyes, as I lost my left eye, and about six months ago my right eye became affected with black spots over the sight as did the left eye—perhaps some twenty of them—but since I have been using your **Discovery** they all left my right eye but one; and, thank God, the bright light of heaven is once more making its appearance in my *left* eye. I am wonderfully astonished at it, and thank God and your **Medical Discovery.**

Yours truly,

HANK WHITE.

(PATENT ALLOWED,)

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Perfect Comfort. Holds the worst rupture with ease. Has a new Pad which can be made larger or smaller by the patient. Sent by mail everywhere. Illustrated catalogue and rules for self-measurement sent securely sealed. **G. V. House Mfg. Co.,** 744 Broadway, N. Y. City.

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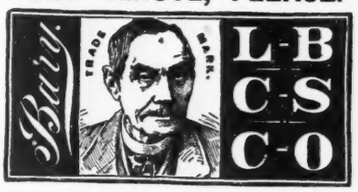

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A Statistical Review and Farmers' Reference

Of the Present and Past Crops and Live Stock of the United States, Prices and Values.

The following tables have been compiled by the AMERICAN AGRICULTURIST from advance sheets of the United States census of 1890 (covering the calendar and farm year of 1889), from the returns to the United States Department of Agriculture, and from other authentic sources. We present, in small compass, an immense amount of information of great importance to every farmer. The five year averages given for wheat, corn and oats are for 1885 to 1889 inclusive.

Table No. 1. Cotton Trade of the United States for 50 Years.

Years ending August 31.	*Crop in Bales.*	*United States. Consumption in Bales.*	*Exports in Bales.*	*Average Net Weight per Bale. Pounds.†*	*Average price per pound of middling uplands* in New York. Cents.	in U. S. Exports Cents.*	*in Liverpool. Pence.*
1841	1,634,954	267,850	1,313,500	394	9.50		5.73
1842	1,683,574	267,850	1,465,500	397	7.85		4.86
1843	2,378,875	325,129	2,010,000	409	7.25		4.37
1844	2,030,409	346,750	1,629,500	412	7.73		4.71
1845	2,394,503	389,000	2,083,700	415	5.63		3.92
1846	2,100,537	422,600	1,666,700	411	7.87		4.80
1847	1,778,651	428,000	1,241,200	431	11.21		6.03
1848	2,439,786	616,044	1,858,000	417	8.03		3.93
1849	2,869,938	642,485	2,228,000	436	7.55		4.09
1850	2,233,718	613,498	1,590,200	429	12.34		7.10
1851	2,454,442	485,614	1,988,710	416	12.14		5.51
1852	3,126,310	689,603	2,443,646	428	9.50		5.05
1853	3,416,214	803,725	2,528,400	428	11.02		5.54
1854	3,074,979	737,236	2,319,148	430	10.97		5.31
1855	2,982,634	706,417	2,244,209	434	10.39	8.7	5.60
1856	3,665,557	777,739	2,954,606	420	10.30	9.5	6.22
1857	3,093,737	819,936	2,252,657	444	13.51	12.6	7.73
1858	3,257,339	595,562	2,590,455	442	12.23	11.7	6.91
1859	4,018,914	927,051	3,021,403	447	12.08	11.6	6.68
1860	4,861,292	978,043	3,774,173	461	11.00	10.8	5.97
1861	3,849,469	843,740	3,127,508	477	13.01	11.1	8.50
1862					31.29	23.5	18.37
1863	The cotton trade was practically suspended during				67.21	58.5	22.46
1864	the war.				101.50	82.4	27.17
1865					83.38	76.4	19.11
1866	2,269,316	666,100	1,554,664	441	43.20	42.8	15.30
1867	2,097,254	770,030	1,557,054	444	31.59	30.1	10.98
1868	2,519,554	906,636	1,655,816	445	24.85	19.2	10.52
1869	2,366,467	926,374	1,465,880	444	29.01	24.9	12.12
1870	3,122,551	865,160	2,206,480	440	23.98	23.5	9.89
1871	4,352,317	1,110,196	3,169,009	442	16.95	14.9	8.55
1872	3,974,351	1,237,330	1,957,314	443	20.48	19.3	10.78
1873	3,930,508	1,201,127	2,679,986	444	18.15	18.8	9.65
1874	4,170,388	1,305,943	2,840,981	444	17.	15.4	8.36
1875	3,832,991	1,193,005	2,684,708	440	15.	15.0	7.67
1876	4,632,313	1,351,870	3,234,244	444	13.	12.9	6.61
1877	4,474,069	1,428,013	3,030,835	440	11.73	11.8	6.29
1878	4,773,865	1,483,022	3,360,254	450	11.28	8.3 11.1	9.29
1879	5,074,155	1,558,329	3,481,004	447	10.83	9.5 9.9	6.16
1880	5,761,252	1,789,978	3,885,003	454	12.02	9.0 11.5	6.94
1881	6,605,750	1,938,937	4,587,346	460	11.34	10.0 11.4	6.48
1882	5,456,048	1,964,535	3,582,622	450	12.16	9.9 11.4	6.70
1883	6,949,756	2,073,096	4,766,597	470	10.63	9.0 10.8	5.90
1884	5,713,200	1,876,683	3,916,581	462	10.64	9.2 10.5	6.03
1885	5,706,165	1,753,125	3,947,972	460	10.54	9.1 10.6	5.76
1886	6,575,691	2,162,544	4,336,203	463	9.44	8.1 9.9	5.14
1887	6,505,087	2,111,532	4,445,302	464	10.25	8.5 9.5	5.42
1888	7,046,833	2,257,247	4,627,502	467	10.27	8.5 9.8	5.51
1889	6,938,290	2,314,091	4,742,347	477	10.71	8.3 9.9	5.73
1890	7,313,726	2,390,959	4,906,627	478	11.53	8.6 10.2	5.97
1891	8,655,518	2,530,916	5,834,848	480	9.03	7.3 9.9	4.24

Plantation price of Cotton December 1.

*This column shows the average value per pound of the cotton exported from the United States during the fiscal years ended June 31.

†The gross weight per bale is 18 to 24 pounds per acre more than the net weight.

TABLE NO. 2. ACREAGE, YIELD AND VALUE OF COTTON IN THE UNITED STATES.

Crop Year.	*Acres Planted.*	*Net Crop in Pounds.*	*Net pounds per acre.*	*Bale per acre.*	*Total value of crop.*	*Value per acre.*
1873	10,816,000	1,850,000,000	171	0.39	$310,063,419	$29
1874	10,982,000	1,686,000,000	154	0.35	272,177,136	24
1875	11,635,000	2,059,000,000	177	0.40	399,445,168	34
1876	11,500,000	1,972,000,000	173	8.39	252,602,340	22
1877	11,825,000	2,148,000,000	182	0.40	255,768,165	21
1878	12,240,000	2,268,000,000	185	0.42	236,586,031	19
1879	12,680,000	2,615,600,000	206	0.46	313,696,452	24
1880	16,123,000	3,038,645,000	189	0.41	356,524,911	22
1881	16,851,000	2,455,221,600	146	0.32	304,298,744	18
1882	16,276,000	3,266,075,290	201	0.43	327,938,137	20
1883	16,780,000	2,639,498,400	157	0.34	288,803,902	17
1884	17,426,000	2,624,835,900	151	0.33	287,253,972	16
1885	18,379,444	3,044,544,933	166	0.36	313,723,080	17
1886	18,581,012	3,018,360,368	163	0.35	298,504,215	16
1887	18,961,897	3,230,871,911	174	0.37	336,435,653	17
1888	19,362,073	3,309,564,330	171	0.36	344,069,801	17
1889	19,979,040	3,492,880,318	175	0.37	373,161,831	19
1890	20,583,935	4,153,246,560	202	0.42	459,792,047	21
Averages	15,610,076	2,718,464,095	175	0.38	318,380,167	21
Totals	.....	48,932,343,710	...	....	$5,730,843,004	..

TABLE NO. 3. AVERAGE YIELD PER ACRE OF COTTON IN POUNDS BY STATES.

	1891	1890	1889	1888	1887	1886	Av.
Virginia.	151	168	83	133	147	148	136
N. Car'l'a	178	182	98	145	170	157	150
S. Car'l'a	160	175	141	134	169	140	152
Georgia	155	165	155	135	141	135	146
Florida	120	108	139	100	81	102	106
Alabama	165	160	163	139	143	130	147
Miss'ippi	190	200	165	159	181	175	176
Lousiana	200	238	180	169	210	221	203
Texas	195	196	169	166	170	200	180
Arkans's	210	225	217	188	187	240	212
Tenn'see	170	191	89	178	153	167	156
U. States	179	187	159	154	164	168	166

The yield per acre by States has varied considerably, as returned to the Department of Agriculture, as Table No. 3 shows. The average yield for the United States in this table varies somewhat from that given in Table No 2, as the latter is based on the amount of cotton actually moved during the year ended August 31, following the crop year. Thus the Department returned the yield for 1890 as 187 pounds per acre, but the cotton moved during the year ended August 31, 1891, made the average 202 pounds per acre.

In the thirteen years from 1879 to 1891 inclusive, Great Britain's consumption of cotton has increased 48 per cent., the Continent's 75 per cent., the United States' 66 per cent., while India has more than trebled (actually 340 per cent. increase) her consumption, so that in 1891 the world consumed 72 per cent. more cotton than in 1879. This growth of cotton manufacture bids fair to continue. Since 1888, the number of spindles reported in the world increased from 82½ to over 88 millions.

TABLE NO. 4. THE WORLD'S CONSUMPTION OF COTTON.

[Bales of 400 lbs. each, 000's omitted in all except the first column.]

Years ended Aug. 31.	*Great Britain.*	*Continent.*	*United States.*	*India.*	*Total.*
1879	2,843,000	2,596	1,764	262	7,485
1880	3,350,000	2,750	1,981	301	8,382
1881	3,572,000	2,956	2,118	372	9,017
1882	3,640,000	3,198	2,197	390	9,425
1883	3,744,000	3,380	2,375	447	9,946
1884	3,666,000	3,380	2,244	521	9,811
1885	3,433,000	3,255	1,909	585	9,182
1886	3,628,000	3,465	2,278	630	10,001
1887	3,694,000	3,640	2,423	712	10,469
1888	3,841,000	3,796	2,530	772	10,939
1889	3,770,000	4,069	2,685	871	11,395
1890	4,034,000	4,290	2,731	988	12,043
1891	4,245,000	4,538	2,958	1,155	12,896

The United States Live Stock Census.

[000's omitted in all except the first column.]

TABLE NO. 5. *a* HORSES ON FARMS (NUMBER.)

GROUP	1890	1880	1870	1860	1850	1840
No. Atlantic	1,738,864	1,555	1,336	1,280	1,074	1,190
So. Atlantic	880,579	801	591	774	771	891
No. Central	8,570,967	5,467	3,613	2,542	1,399	1,113
So. Central.	2,354,529	1,921	1,312	1,436	1,056	1,141
Western ...	1,431,078	613	294	217	37	.....
Total *b*....	14,976,017	10,357	7,145	6,249	4,337	4,335

a Exclusive of horses in cities and villages and on farms of under three acres in 1890 and 1880. *b* Also exclusive of 517,128 horses on ranges.

TABLE NO. 6. *a*. MULES AND ASSES. (NUMBER.)

GROUP †	1890	1880	1870	1860	1850
No. Atlantic.....	43,683	39	32	17	8
So. Atlantic.....	417,393	347	231	273	153
No. Central.....	657,482	540	305	165	63
So. Central	1,093,714	837	524	679	324
Western	83,773	51	34	17	11
Total *b*.....	2,296,045	1,814	1,126	1,151	559

a Exclusive of mules in cities; *b* exclusive of 19,542 on ranges.

TABLE NO. 7. MILCH COWS (NUMBER).

Name of Group.	*1890	1880	1870	1860	1850
North Atlantic,	3,521,800	3,191	2,833	2,616	2,188
South Atlantic,	1,466,643	1,281	1,001	1,239	1,247
North'rn Central,	7,613,287	5,402	3,294	2,557	1,564
South'rn Central,	2,665,948	2,147	1,494	1,859	1,356
Western,	690,205	422	313	316	29
Total,	15,957,883	12,443	8,935	8,586	6,385

TABLE NO. 8. CATTLE OTHER THAN MILCH COWS.

Group.	*1890	1880	1870	1860	1850	1840
No. Atlantic,	2,359,476	2,580	2,112	2,588	2,523	4,849
So. Atlantic,	2,615,089	2,580	1,938	2,712	2,933	3,499
No. Central,	13,679,459	9,956	5,061	4,693	2,809	3,152
So. Central,	9,555,006	6,212	5,025	5,865	2,807	3,471
Western,	8,239,994	2,154	748	1,176	321	.....
Total,	36,849,024	23,482	14,885	17,034	11,394	14,972

TABLE NO. 9. SWINE, (NUMBER).

Group.	*1890	1880	1870	1860	1850	1840
No. Atlantic,	2,432,023	2,521	1,769	2,508	2,670	4,414
So. Atlantic,	5,837,723	5,692	3,860	7,193	7,497	6,567
No. Central,	29,005,292	27,653	11,312	12,114	8,536	6,942
So. Central,	12,162,599	10,939	7,583	11,137	10,773	8,379
Western,	1,265,143	877	611	565	878	.....
Total,	51,602,780	47,682	25,135	33,513	30,354	26,301

TABLE NO. 10. SHEEP (NUMBER).

Group.	*1890	1880	1870	1860	1850	1840
N. Atlantic,	3,817,302	4,971	5,546	6,164	7,694	10,926
S. Atlantic,	2,168,321	2,530	2,110	2,541	2,980	2,687
N. Central,	11,905,259	13,430	13,638	8,141	7,743	3,567
S. Central,	6,980,688	5,102	3,232	3,572	2,897	2,132
Western,	19,464,502	9,159	3,952	2,052	413	.....
Total,	44,336,072	35,192	28,478	22,471	21,727	19,311

TABLE NO. 11. VALUE OF LIVE STOCK ON FARMS.

[000,000's omitted in all except the first column.]

Group.	*1890	1880	1870	1860	1850	1840
N. Atl'tic,	$ 360,738,807	286	413	258	176	
S. Atl'tic,	$ 193,823,682	129	138	165	109	
N. Cent'l.	$1,182,704,060	763	667	321	127	
S. Cent'l..	$ 405,077,341	235	249	297	129	
Western,.	$ 276,442,268	88	59	49	7	
Total ...	$2,418,786,158	1,500	1,525	1,089	544	

*Department of Agriculture returns for 1889.

†See explanatory map on Page 77.

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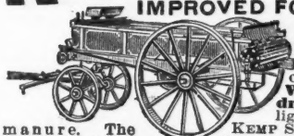

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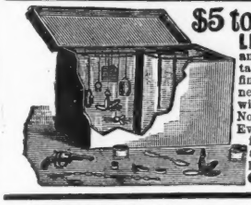

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STATES AS GROUPED BY THE CENSUS.

TABLE NO. 12. THE OAT CROP OF THE UNITED STATES.

	Acres, No. 000's omitted.		*Yield per acre in bush.*			*Total Crop. Bus'ls. 000's omitted.*			*Farm Price. in c'ts p. bu.*			*Total value in dollars, 000's omitted.*		
	1891.	*Av. 5 yrs.*	**'91**	**'90**	*Av. 5 yrs*	**'91.**	**'90.**	*Av. 5 yrs.*	**'91**	**'90**	*Av.*	**1891.**	**1890.**	*Av. 5 yrs.*
Maine	106	95	35	27	29	3,697	2,847	2,730	45	57	43	1,664	1,623	1,179
New Hampshire	31	33	35	26	30	1,098	862	979	48	56	44	527	483	431
Vermont	108	107	38	26	30	4,091	2,793	3,246	41	50	38	1,677	1,396	1,311
Massachusetts	23	24	33	23	28	768	598	678	49	55	45	376	329	303
Rhode Island	7	6	32	22	26	216	153	149	49	54	44	107	83	75
Connecticut	38	39	30	20	26	1,147	780	1,011	45	53	43	516	414	434
New York	1,411	1,388	32	18	25	45,142	23,913	34,784	38	50	38	17,154	11,956	12,971
New Jersey	139	140	29	17	24	4,023	2,449	3,294	40	50	38	1,609	224	3,243
Pennsylvania	1,229	1,294	27	17	25	33,456	21,972	32,881	37	48	36	12,377	10,546	11,518
Delaware	24	22	20	14	19	482	298	421	39	45	35	188	134	147
Maryland	112	116	19	12	19	2,127	1,357	2,152	38	44	34	808	597	727
Virginia	726	659	11	11	14	7,985	6,587	8,706	40	45	37	3,194	2,964	3,139
North Carolina	653	661	10	9	11	6,535	6,198	3,799	51	51	46	3,333	3,161	3,117
South Carolina	385	395	11	11	11	4,239	4,168	4,023	64	60	57	2,713	2,501	2,281
Georgia	510	598	12	10	11	6,119	5,455	6,357	61	60	56	3,732	3,273	3,555
Florida	52	53	11	11	12	577	573	578	67	61	55	387	349	354
Alabama	393	415	13	12	14	5,111	4,864	4,560	60	62	55	3,067	3,016	2,569
Mississippi	344	360	12	13	11	4,127	4,778	4,061	58	60	55	2,393	2,867	2,253
Lousiana	42	40	11	13	12	463	567	463	52	61	51	261	346	239
Texas	703	307	26	21	22	18,283	11,059	12,605	47	55	41	8,585	6,083	5,103
Arkansas	300	281	17	15	18	5,095	3,967	4,681	42	53	42	2,140	2,102	1,976
Tennessee	615	611	14	10	13	8,603	6,486	7,383	40	45	36	3,441	2,919	3,082
West Virginia	138	143	17	11	17	2,343	1,506	2,371	40	45	35	937	678	816
Kentucky	372	489	19	8	17	7,070	3,954	8,186	39	45	34	2,757	1,779	2,678
Ohio	1,056	1,066	32	19	29	33,785	20,004	30,477	33	42	30	11,149	8,402	8,968
Michigan	932	814	33	25	30	30,745	25,033	24,667	32	44	33	9,839	11,014	7,834
Indiana	915	1,026	26	16	26	23,801	17,800	26,676	32	41	29	7,616	7,298	7,427
Illinois	3,136	3,607	34	18	31	106,637	70,821	112,428	29	41	27	30,925	29,037	28,940
Wisconsin	1,482	1,463	36	28	29	53,349	38,919	41,779	28	40	28	14,938	15,568	11,685
Minnesota	1,531	1,423	38	27	30	58,144	38,402	43,288	27	37	27	15,699	14,209	11,380
Iowa	2,767	2,561	39	27	31	107,826	71,397	78,156	26	38	24	28,035	27,131	18,471
Missouri	1,201	1,377	25	17	25	30,017	24,579	33,348	29	39	26	8,705	9,586	8,500
Kansas	1,238	1,375	33	25	27	40,845	31,269	35,401	27	38	26	11,028	11,882	8,977
Nebraska	1,264	964	32	21	27	40,437	22,430	25,160	23	39	22	9,301	8,748	5,539
California	75	77	29	28	28	2,172	1,943	2,044	63	56	52	1,368	1,088	1,071
Oregon	233	209	31	30	27	7,224	6,658	5,636	41	50	42	2,962	3,329	2,397
Nevada	....	8	..	..	28	....	....	217	..	55	53	....	....	117
Colorado	110	72	34	29	31	3,733	2,498	2,090	38	50	43	1,419	1,249	914
Arizona	....	....	..	..	..	....	....	....	..	58	64	....	....	....
Dakota	1,242	1,159	33	21	24	40,996	24,846	28,054	25	32	28	10,249	7,951	7,729
Idaho	38	36	32	30	30	1,213	1,093	1,044	50	58	48	606	634	501
Montana	104	71	32	31	32	3,334	2,797	2,201	48	59	47	1,601	1,650	1,064
New Mexico	16	16	22	24	27	359	392	402	55	57	46	196	223	184
Utah	40	34	29	28	28	1,150	1,059	911	42	55	44	483	582	408
Washington	106	95	35	34	35	3,763	3,497	3,277	41	47	43	1,543	1,644	1,403
Wyoming	....	3	..	..	..	....	....	89	..	56	48	....	....	40
Total and Average	25,612	26,094	29.3	19.8	25.0	750,432	523,621	652,124	32.2	42.4	30.7	241,603	222,048	195,218

The Grain Census of the United States.

[000's omitted in all the columns.]

TABLE NO. 13. OATS, BUSHELS.

Group.	***1890**	**1880**	**1870**	**1860**	**1850**	**1840**
N. Atlantic,	82,790	83,967	84,952	77,997	59,570	51,941
S. Atlantic,	32,821	21,993	18,908	20,220	23,295	24,232
N. Central,	572,215	270,166	159,805	62,953	42,329	30,334
S. Central,	45,313	21,645	13,628	9,339	21,298	16,564
Western,	18,376	10,087	4,814	2,135	76	.....
Total,	751,515	407,859	282,107	172,643	146,568	123,071

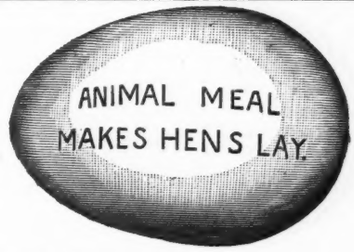
TABLE NO. 14. INDIAN CORN, BUSHELS.

Group.	***1890**	**1880**	**1870**	**1860**	**1850**	**1840**
N. Atl'c,	81,037	91,039	67,258	67,146	56,629	36,567
S. Atl'c,	158,736	129,266	86,527	134,493	125,504	105,370
N. Cent.,	1,500,750	1,285,285	439,245	406,167	222,206	105,853
S. Cent.,	364,886	245,520	165,583	229,596	187,339	129,741
West'n,	7,483	3,482	2,331	1,392	390	.....
Total,	2,112,892	1,754,592	760,945	838,793	592,071	377,532

TABLE NO. 15. WHEAT, BUSHELS.

Group.	***1890**	**1880**	**1870**	**1860**	**1850**	**1840**
N. Atlantic,	28,345	34,179	35,154	24,570	31,181	28,288
S. Atlantic,	25,285	28,534	22,327	28,737	20,493	18,514
N. Central,	333,242	329,551	194,935	95,005	43,842	27,518
S. Central,	30,875	24,278	14,414	17,129	4,436	10,503
Western,	72,813	42,941	20,917	7,664	533	.....
Total,	490,560	459,483	287,746	173,105	100,486	84,823

*Department of Agriculture returns for 1889.



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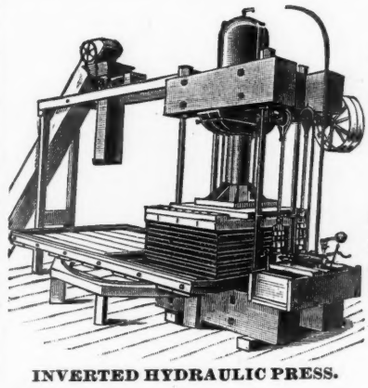

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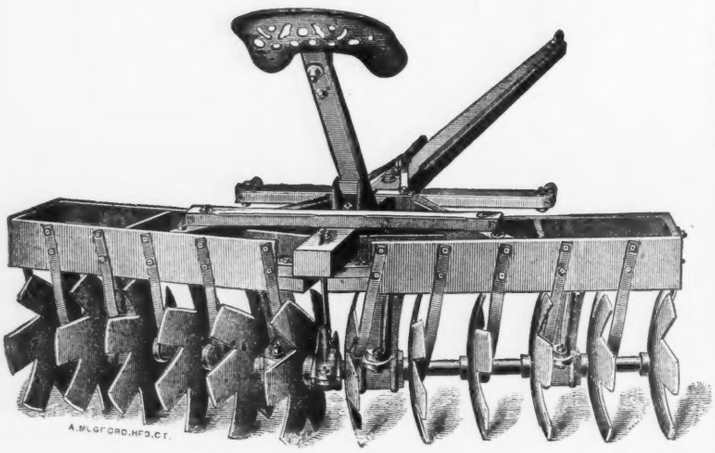
Clark's Cutaway Harrows, Clark's Revolving Plows, 4-C Cultivator & Mower Knife Grinder.



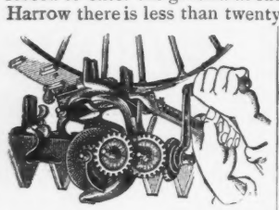
The above cut represents the 6-foot, or A Series of Cutaway Harrows.

With all the old pattern Harrows it has been difficult to control certain conditions, such as light swards, sodded lands, fields that have been plowed for several months, or wheat, corn, oats and other stubble lands; in fact, heretofore, the tool to be used upon that class of lands has been the plow; but with the Cutaway Harrow the condition has changed. With this harrow many of these fields can now be cultivated in a much more perfect manner than is possible with the plow, and in less than half the time.

Nearly all solid disks used are sixteen inches in diameter, and present a cutting edge to the earth of more than fifty inches to each revolution. When cutting four inches deep, each disk has a bearing upon the ground of nearly eighteen inches, making eighteen feet of bearing surface in a twelve disk harrow. A Cutaway Harrow, with the same size and number of disks, would have less than eight feet bearing, as each disk is composed of six blades of less than four inches each.

In the Solid Disk Harrows more than fifty feet of cutting edge is forced to enter the ground at each revolution, while in the CUTAWAY Harrow there is less than twenty-two feet. This small bearing allows the blades to enter the ground easier, and when in, stirs the earth much more effectually.

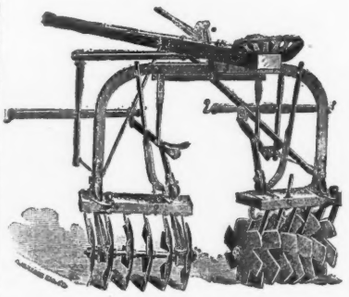
The blades enter the earth easily; this remedies the first defect; and while these blades are revolving, they move sideways only a portion of the earth, thus obviating the second defect. With each revolution seventy-two shovel blades enter the earth, making nearly a quarter turn, and swing sideways over four inches. This action thoroughly stirs and pulverizes the soil.



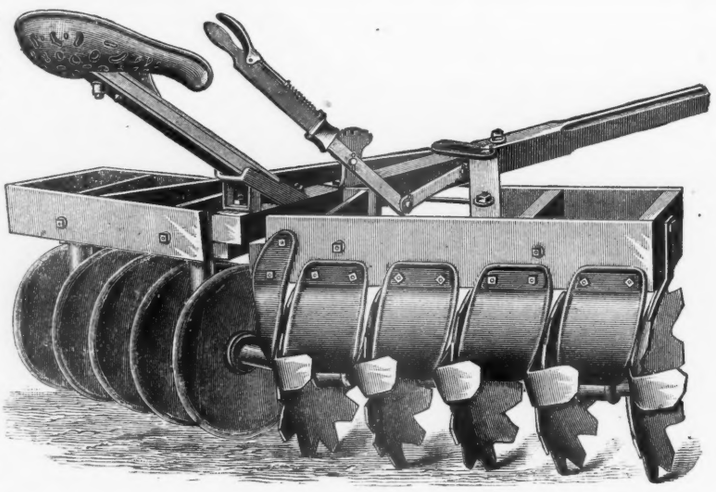
The above cut represents the New Improved Dutton Grinder, which is one of the most useful tools manufactured.

Entirely new principles in cultivating corn or cotton—Clark's Cutaway Corn or Cotton Cultivator. It has two gangs, each having two 14-inch and three 16-inch Cutaway Disks that thoroughly pulverize and cultivate the soil.

The small disks are generally used on the ends, as they will not dig so close to the crop, but the large disks can be used on the ends if desired.



The above cut represents the 4-C Cultivator which is reversible, and used for cultivating either Cotton, Corn, Potatoes, or any hill crop.



The above cut represents the greatest improvement of the age, the celebrated Clark's Cutaway Revolving Plow.

This Plow is especially adapted for the hard adobe lands of the West, and can be used in the dryest seasons of the year, making a perfect seed bed. Send for new illustrated circular of this tool, showing recent improvements.

We now manufacture all sizes of the Celebrated Cutaway Harrows and Cultivators from two feet to sixteen feet; also the New Revolving Plow from 32 inches to 60 inches. Send for new fully descriptive circular of these goods. Agents wanted in every county.

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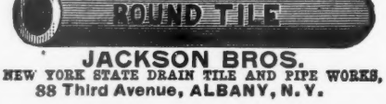

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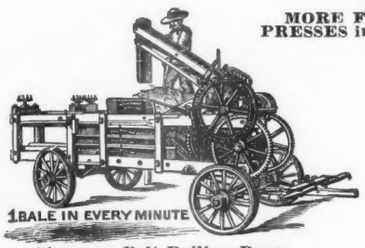

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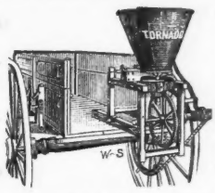

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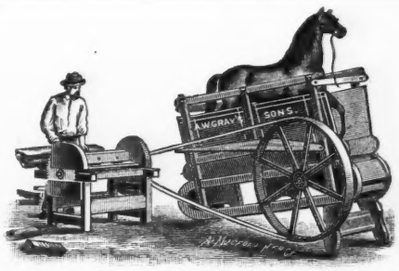

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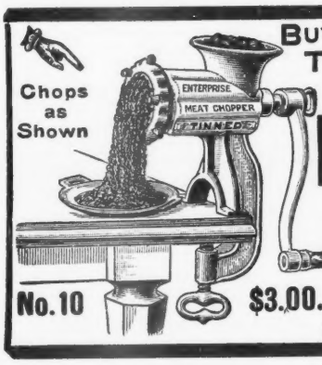

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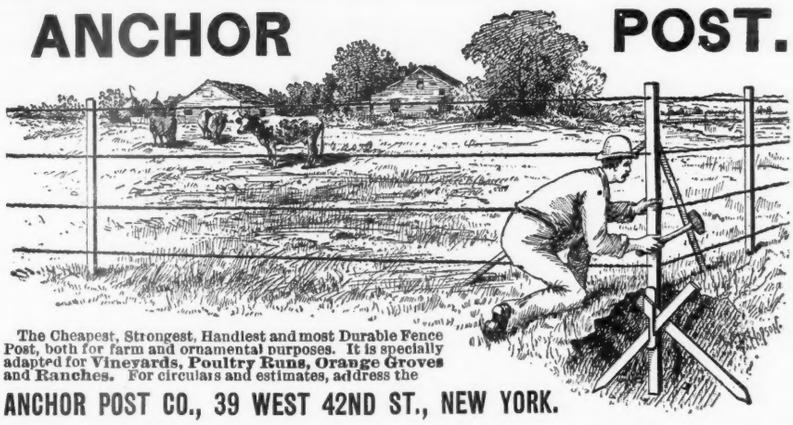

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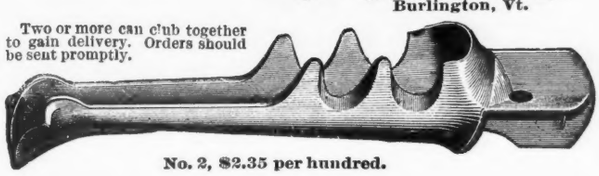

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Pleasant Lake, Ind. (Branch, Baltimore, Md.)

A Statistical Review and Farmers' Reference.

[Continued from Page 74.]

Table No. 15. The Wheat Crop of the United States.

	Acres, No. 000's omitted.		Yield per acre in bush.			Total Crop. Bus'ls, 000's omitted.			Farm price in cts. p. bu.			Total value in dollars, 000's omitted.		
	1891	Av. 5 yrs.	'91	'90	Av.	'91	'90	Av. 5 yrs.	'91	'90	Av.	1891	1890	Av. 5yrs.
Maine	41	41	15	14	14	615	543	560	112	115	112	$ 589	624	629
New Hampshire	9	10	16	15	14	148	140	143	113	115	111	167	161	160
Vermont	20	21	17	17	17	334	335	347	111	111	106	371	372	369
Massachusetts	....	1	17	..	15	....	....	17	113	115	102	....	....	17
Rhode Island	....	....	..	..	16	....	....	....	...	...	...	....	....	...
Connecticut	2	2	17	16	16	31	30	33	105	110	103	33	33	34
New York	641	659	17	15	15	10,889	9,288	9,751	102	100	93	11,107	9,288	9,039
New Jersey	139	142	15	12	13	2,083	1,680	1,779	104	100	95	2,166	1,680	1,686
Pennsylvania	1,337	1,388	16	12	12	21,399	16,049	16,702	1	99	91	21,399	15,889	15,289
Delaware	98	95	13	10	12	1,269	919	1,064	1	96	88	1.269	883	945
Maryland	541	557	14	12	12	7,567	6,208	6,601	102	92	87	7,718	5,711	5,811
Virginia	802	711	9	7	8	7,218	5,614	5,601	1	96	88	7,218	5,389	4,969
North Carolina	732	713	7	4	6	5,121	3,156	3,957	102	100	96	5,223	3,156	3,783
South Carolina	180	190	6	4	5	1,082	750	1,017	115	105	103	1,245	788	1,048
Georgia	310	373	8	4	5	2,478	1,411	1,983	110	110	103	2,726	1,552	2,032
Florida	...	....	..	..	..	....	....	....	...	...	...	....	....	....
Alabama	281	300	8	5	6	2,251	1,319	1,767	101	109	103	2,476	1,437	1,820
Mississippi	62	61	8	..	7	492	286	360	1.	110	103	496	314	370
Louisiana	....	....	..	..	..	....	....	....	...	...	...	....	....	....
Texas	536	552	12	6	10	6,435	3,575	5,323	87	95	87	5,598	3,396	4,649
Arkansas	226	231	10	7	9	2,263	1,575	1,948	90	98	89	2,037	1,544	1,729
Tennessee	1,187	1,199	10	4	7	11,868	7,873	8,975	93	97	84	11,037	7,637	7,553
West Virginia	305	301	10	8	10	3,051	2,326	2,854	96	95	84	2,929	2,210	2,442
Kentucky	962	1,028	13	9	11	12,511	9,152	10,784	90	92	81	11,260	8,420	8,654
Ohio	2,447	2,602	17	13	14	17,127	29,984	34,362	92	91	82	15,757	27,286	27,987
Michigan	1,562	1,611	18	15	15	41,594	20,271	23,250	91	90	81	37,851	18,244	18,954
Indiana	2,593	2,718	18	10	13	46,680	27,928	35,215	86	88	75	40,145	24,577	27,288
Illinois	2,224	2,224	18	12	14	40,029	18,161	30,831	85	87	77	34,024	15,800	23,748
Wisconsin	1,052	1,204	14	13	12	14,728	13,096	14,335	86	83	76	12,666	10,870	10,846
Minnesota	3,238	3,110	18	12	12	58,288	38,356	38,169	78	81	72	45,465	31,068	26,946
Iowa	1,702	2,220	15	12	12	25,529	19,041	24,710	81	80	69	20,678	15,233	14,977
Missouri	2,084	1,622	13	11	14	27,098	17,638	21,301	80	83	72	21,679	14,640	14,835
Kansas	3,087	1,370	16	14	14	49,392	28,195	21,446	73	77	67	36,056	21,710	13,167
Nebraska	1,489	1,521	15	11	11	22,334	15,315	16,141	73	76	62	16,303	11,639	9,886
California	2,912	2,788	12	12	13	34,946	29,121	33,589	95	76	75	33,199	22,132	25,173
Oregon	896	886	18	15	16	18,130	12,865	13,667	88	75	71	15,955	9,649	9,819
Nevada	20	12	17	.	16	346	250	194	87	86	81	301	215	158
Colorado	101	112	20	19	19	2,017	1,777	2,181	73	81	76	1,472	1,439	1,692
Arizona	27	3,724	..	..	14	....	311	324	75	90	88	....	280	278
Dakota	4,378	3,780	17	9	10	78,792	....	40,642	70	70	65	55,154	28,288	26,221
Idaho	91	74	20	16	15	1,811	1,370	1,246	84	78	78	1,527	1,069	976
Montana	....	96	20	17	19	....	1,488	1,659	..	80	78	....	1,191	1,303
New Mexico	....	84	13	13	15	....	1,105	1,114	..	95	84	....	1,050	953
Utah	124	116	18	20	17	2,227	2,279	1,923	80	78	70	1,782	1,778	1,364
Washington	393	450	18	23	18	7,068	8,071	7,967	87	76	71	6,141	6,134	5,722
Wyoming	....	3	..	..	..	....	....	63	..	82	64	....	....	44
Average and total	39,046	37,199	15.0	11.1	11.9	585,695	399,262	443,847	85.3	83.8	76.3	493,320	334.774	337,470

Table No. 16. The Corn Crop of the United States.

	Acres, No. 000's omitted.		Yield per acre in bushels.			Total crop. Bus'ls, 000's omitted.		Av.	Farm price in cts. p. bu.			Total value in dollars, 000's omitted.		
	1891.	5 yrs.	'91	'90	Av.	1891*	1890	5 yrs.	'91	'90	Av.	1891	1890	Av. 5 yrs.
Maine	30	30	38	36	31	1,122	1,008	952	80	74	68	898	746	643
New Hampshire	38	37	36	37	35	1,353	1,259	1,221	77	72	67	1,042	906	818
Vermont	58	60	37	33	31	2,133	1,839	1,928	76	72	65	1,621	1,324	1,258
Massachusetts	58	58	40	35	33	2,317	1,868	1,940	78	70	63	1,807	1,307	1,271
Rhode Island	13	13	35	30	33	457	402	340	80	72	67	365	290	268
Connecticut	59	57	36	36	33	2,112	2,014	1,905	76	70	64	1,605	1,410	1,220
New York	681	695	32	25	29	20,527	17,101	21,256	66	65	57	13,548	11,116	12,063
New Jersey	361	352	33	31	30	11,910	11,185	10,630	65	62	54	7,742	6,935	5,756
Pennsylvania	1,397	1,399	33	28	30	46,108	38,043	42,026	57	60	56	26,281	22,826	21,201
Delaware	226	220	19	19	17	4,324	4,128	3,960	55	50	44	2,378	2,064	1,753
Maryland	740	727	25	23	23	18,571	16,333	16,669	53	50	45	9,811	8,166	7,553
Virginia	2,131	2,132	19	18	16	40,488	36,922	35,274	50	55	48	20,244	20,307	16,972
North Carolina	2,727	2,685	14	13	12	38,172	36,264	32,540	56	55	56	21,376	19,945	18,110
South Carolina	1.608	1,540	12	10	9	19,293	16,078	15,287	70	70	61	13,505	11,254	9,333
Georgia	3,101	2,945	12	11	11	37,209	31,306	31,274	68	69	61	25,302	21,601	19,182
Florida	496	467	11	9	10	5,460	4,570	4,746	80	75	68	4,368	3,428	3,216
Alabama	2,539	2,468	13	10	12	33,007	25,390	30,673	63	68	59	20,795	17,265	17,486
Mississippi	2,010	1,942	15	13	14	30,153	24,396	28,086	58	70	57	17,489	17,077	15,901
Louisiana	1,082	1,022	17	16	15	18,401	16,979	16,771	60	70	56	11,040	11,885	9,376
Texas	4,610	4,484	20	16	17	92,205	63,802	77,128	57	72	51	52,557	45,938	38,180
Arkansas	2,123	2,080	21	16	19	44,577	33,443	40,232	46	65	54	20,506	21,738	20,266
Tennessee	3,637	3,589	23	18	20	83,643	67,692	74,549	41	52	46	34,294	35,200	32,763
West Virginia	678	671	27	20	21	18,318	13,435	14,498	52	62	49	9,525	8,061	7,006
Kentucky	2,901	3,099	30	23	23	87,018	63,645	73,434	39	49	41	33,937	31,186	29,074
Ohio	2,856	2,897	34	21	28	97,089	65,876	83,569	41	51	40	39,806	33,597	32,564
Michigan	977	940	30	27	22	29,316	26,580	24,981	48	55	44	14,073	14,619	10,962
Indiana	3,640	3,636	32	24	28	116,489	89,025	102,271	38	47	36	44,266	41,842	11,936
Illinois	7,727	7,774	31	25	27	240,530	187,446	215,105	37	43	34	89,096	80,602	69,263
Wisconsin	1,113	1,076	27	29	27	30,052	33,061	29,695	44	45	38	13,223	14,877	11,253
Minnesota	784	698	27	28	28	21,163	21,286	20,231	37	42	34	7,830	8,940	6,967
Iowa	9,034	8,105	37	26	30	334,274	232,439	248,597	30	41	30	90,282	95,300	70,530
Missouri	6,728	6,604	30	26	26	201,851	175,345	176,285	38	44	33	76,703	77,152	56,992
Kansas	6,484	5,467	27	11	21	174,954	55,269	131,444	34	51	32	59,484	28,187	35,028
Nebraska	3,995	3,802	36	20	29	143,807	55,310	111,669	26	48	17	37,390	26,549	26,574
California	161	157	36	28	29	5,813	4,396	4,428	71	65	63	4,127	2,858	2,786
Oregon	8	7	32	22	24	261	173	170	71	66	67	186	114	115
Nevada	....	1	..	..	..	....	....	23	..	..	70	....	....	16
Colorado	43	36	20	18	25	868	767	896	53	63	58	460	483	543
Arizona	....	3	..	..	19	....	....	63	..	70	73	....	....	46
Dakota	973	748	25	13	22	24,326	12,030	16,477	40	50	37	9,731	6,015	6,076
Idaho	....	2	..	..	..	..	..	49	..	..	62	....	....	31
Montana	....	1	..	..	..	..	..	24	..	70	65	....	....	14
New Mexico	57	53	13	20	20	746	1,126	1,037	72	73	68	537	822	708
Utah	36	26	25	21	28	888	739	484	60	68	65	533	502	315
Washington	....	4	..	..	24	..	..	94	..	50	64	....	....	62
Wyoming	....	....	..	..	..	..	..	..	..	65	65	....	....	....
Total and Av	77,944	74,810	26.6	20	22	2,104,497	1,489,970	1,742,451	42.2	50.6	38.4	839,764	751,433	656,666

*The returns of the yield of corn in 1891 are likely to be modified by the final returns of huskings, and several excellent judges believe the crop of fairly sound and merchantable corn will be not over 1,850 million bushels.

It is exceedingly interesting to compare these statistics for wheat and corn, also for oats on Page 77, with C. Wood Davis's statement of the area in the same crops in preceding years. See Pages 66, 68 and 73.

No. 17. Agricultural Exports and Imports.

The total value of all imports into the United States, the value of so much of the same as consist of agricultural produce and its per cent. of the whole, are stated below for each fiscal year ended June 30th, since 1850. The same data is given for the imports. The figures under values are round millions of dollars; thus, our exports in 1850 amounted to $135,000,000 in round numbers, of which $109,000,000 were the products of agriculture, so that about eighty-one per cent. of our exports in that year were agricultural products. In the same year our imports were valued at $174,000,000, of which $45,000,000 were farm products, or nearly 26 per cent. of the entire amount of imports.

	EXPORTS.			IMPORTS.		
Fiscal Years ended June 30	Total Value.	Value of Agricul'l Prod.	Per Cent of Agl.	Total Value.	Value of Agricul'l Prod.	Per Cent. of Agl.
1840	$105	$ 93	83	——	——	——
1850	135	109	81	$174	$ 45	26
1851	179	146	82	211	58	27
1852	155	124	80	207	59	29
1853	190	154	81	264	67	26
1854	215	170	79	298	68	23
1855	193	146	76	258	73	28
1856	266	219	82	310	84	27
1857	279	229	82	348	114	33
1858	251	203	81	263	89	34
1859	278	224	81	331	110	33
1860	373	258	69	354	108	31
1861	229	151	66	289	107	37
1862	213	139	65	189	89	47
1863	306	183	60	243	99	41
1864	320	156	49	316	135	43
1865	324	167	52	239	113	47
1866	551	389	71	435	162	37
1867	441	295	67	396	138	33
1868	454	283	62	357	154	43
1869	414	275	66	418	182	44
1870	462	361	78	436	188	43
1871	478	368	77	520	219	42
1872	476	369	77	627	269	43
1873	575	445	78	642	272	42
1874	633	501	79	567	266	47
1875	559	430	77	533	256	48
1876	595	456	77	461	228	49
1877	633	460	73	451	241	53
1878	696	536	77	437	220	50
1879	700	546	78	446	218	49
1880	824	689	83	668	309	46
1881	884	730	82	643	280	44
1882	733	552	75	725	323	45
1883	804	619	77	723	319	44
1884	725	536	74	668	308	46
1885	727	530	73	578	279	48
1886	666	485	73	635	297	47
1887	703	523	74	692	312	45
1888	684	499	73	724	329	45
1889	730	530	73	745	356	48
1890	845	627	74	789	374	47

Table No. 18. Our Exports in Detail.

Raw cotton, breadstuffs, tobacco in leaf or unmanufactured, provisions (comprising hog products—bacon, hams, pork and lard—beef products, dairy products) and animals (cattle, sheep and hogs) make up fully 95 per cent. varying from 95 to 98 per cent.) of our exports of farm produce. The exports of these articles (hog, beef and dairy products, also their total; being stated separately under Provisions), and their total value have been as follows, *in round millions* of dollars:

Years	Cotton.	Breadstuffs.	Tobacco	Provisions.				Animals	Total
				Hog.	Beef.	Dairy.	Total.		
1860	$192	$ 24	$ 16	10	4	3	17	1	251
1861	34	72	14	12	5	6	23	2	143
1862	1	84	12	24	6	7	37	1	135
1863	7	89	20	39	9	11	59	1	175
1864	10	63	23	29	9	12	51	1	148
1865	7	54	42	27	8	19	54	1	157
1866	281	41	29	17	5	7	30	1	382
1867	201	41	20	14	4	9	27	2	290
1868	153	69	23	18	5	8	31	2	276
1869	163	54	21	18	5	7	30	1	267
1870	227	72	21	15	6	10	31	1	352
1871	218	79	20	23	7	10	40	1	358
1872	181	85	24	45	9	9	64	1	355
1873	227	99	23	61	10	12	83	2	433
1874	211	161	30	59	11	13	84	3	489
1875	191	111	25	57	10	15	83	2	412
1876	193	131	23	68	10	13	92	2	441
1877	171	118	29	81	15	17	119	3	439
1878	180	182	25	87	15	18	125	5	516
1879	162	210	25	79	14	18	120	10	528
1880	212	288	16	85	18	19	132	15	663
1881	248	270	19	105	19	23	157	16	709
1882	200	183	19	83	15	17	122	9	532
1883	247	208	19	71	15	14	109	10	594
1884	197	163	18	70	23	16	114	19	511
1885	202	160	22	65	23	14	107	14	506
1886	205	126	27	57	19	11	91	12	461
1887	206	166	26	62	16	10	93	10	501
1888	223	127	22	59	18	11	93	12	477
1889	238	124	19	67	23	11	104	17	502
1890	251	155	21	85	30	13	136	32	596

WELL PRESERVED !

To be so when well-matured. That's the desideratum. To carry the physical strength of our prime into the intellectual strength of our later and wiser years. Much of the world's best work has been done by aged workers. The warning message—"Set thine house in order; for thou shalt die," has been as unwelcome to thousands of busy men and women as it was to King Hezekiah in the days of old.

DRS. STARKEY & PALEN'S COMPOUND OXYGEN has for many busy workers moved "the dead line of 50," ten or twenty years further on—held off old age and invalidity until the wisdom and experience of a lifetime could add the capstone to a lifetime's work. No *drug* will do this. The fountain of youth, if found at all, is everywhere about us. The air we breathe—kind nature's kindly breath—when enriched with more oxygen, and magnetized, ministers marvelously to the peculiar needs of waning physical powers, and arrests the progress of decay.

The well-known fact that our COMPOUND OXYGEN gives great strength and comfort to the period of old age, has induced many a grateful son and daughter to invoke its aid to lighten and brighten an aged parent's declining years. Its helpfulness in such cases is wonderful.

We have proved these facts a thousand times over during the past twenty-two years. Shall we prove them to you? A book of 200 pages gives names and addresses by the score, with fullest details. Do you need health and strength yourself? Is it the need of any of your loved ones? The book is yours for the asking.

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GRAPHOLOGY.

WHAT IT IS.

SEND IN YOUR HANDWRITING AND HAVE YOUR CHARACTER READ.

FRANK LESLIE'S ILLUSTRATED WEEKLY offers on another page in this issue to all subscribers to it and the AMERICAN AGRICULTURIST a new and most unique possibility, namely, to see themselves reflected with wonderful accuracy by the marvelous science of graphology, or reading of character from handwriting.

Wishing to afford subscribers an opportunity to avail themselves freely of the results of this charming science, the publishers have selected a lady of rare intellectual qualities, gifted with keen critical powers and that intuitive insight necessary to read handwriting.

They have, with methodical care and at great expense, caused her to be educated for this purpose. She has recently returned from Europe, where she has studied in Germany in the great centers of thought and mathematical investigation; at Ragatz, the summer residence of one of Germany's greatest graphologists; and in Paris. She has read in the large libraries valuable writings of the East, that fountain-head of all subtle thought. Conviction and enthusiasm have grown with research, and she now stands so prepared by this course of special study, that they offer her services with confidence, and as a *free gift* to our readers.

Graphology, drawn from sources of Oriental subtlety, and fed by streams of modern thought, stands to-day in Europe a flowing fountain of knowledge, leading to the better comprehension of mankind. To the student it is matter for deep and thoughtful speculation.

To those ever searching for something new to elevate and cultivate their minds; to parents seeking careers for their sons; to young men and maidens standing uncertain upon the brink of a mysterious future; to those wishing for a better understanding of themselves, or aiming to pass an idle moment in merry pleasure; to all, a source of unfailing and truthful reply to their queries.

Often by bringing into prominence a leading characteristic and touching into light some unknown talent or half-suspected capacity, illuminating with bright sunshine the ever-flowing roadway to success, upon whose tide so many ships, when the hand at the helm has been strong, have sailed into havens of happiness.

To place the matter briefly: The publishers offer to everybody sending us $1.60 for a subscription to the LESLIE and AMERICAN AGRICULTURIST as appears upon the special colored page supplement, published with this issue, *one* graphological picture—to be a minute and circumstantial reading of character from the handwriting of subscriber, or from that of any one person sent to our care indorsed with *full name and address* of subscriber.

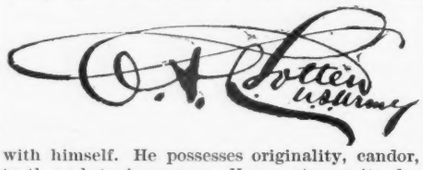
All applications to consist of at least twenty lines of handwriting, signed with full name of applicant. Such communications shall be considered strictly confidential, and should be addressed as follows: FRANK LESLIE'S ILLUSTRATED WEEKLY, Graphological Department, 110 Fifth Avenue, New York.

All answers to be published once a month in the new Colored Edition of FRANK LESLIE'S in the order in which they are received by the department, and under any initials or name specified in application, together with the name of the city or town from which they may be dated.

Do not use single letters or ordinary combinations—as A. B. C., or X. Y. Z.—since in such cases confusion would be the inevitable result, because many persons might send in the same signatures.

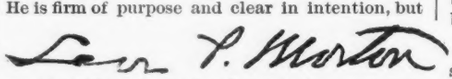
We are fortunately able to reproduce in *facsimile* the handwriting or signatures of a few prominent men of the day, and we give with them brief sketches of the traits and qualities which are to be read on and between the lines.

PROFESSOR TOTTEN.



The signature of Professor Totten is that of a soldier, a scientist, and a man of the world. In it and between the lines ambition, activity, ardor, perseverance, energy, and scientific ability are visible in very marked degree. It is difficult to imagine an obstacle he would not hopefully endeavor to overcome. There is self-esteem, a perfect comprehension of his own capacities, and a disposition to be upon the most excellent terms with himself. He possesses originality, candor, truth, and staying power. Has great capacity, for the comprehension and execution of detail; is stout of heart and strong of will. Is perhaps somewhat of a martinet. He is fluent and ready in construction, clear in explanation, and lucid of mind. Is practical rather than imaginative, though not altogether devoid of the latter quality. His temperament is full of go, his will inflexible, and a matter of importance intrusted to him would be placed in good and capable hands.

L. P. MORTON.



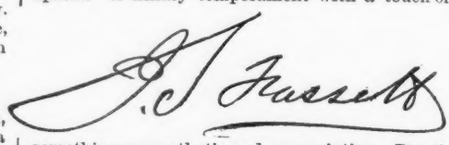
The signature of Vice-President L. P. Morton, suggests at first glance a suspicion of ill-health, a sense of physical discouragement, slight, perhaps, but distinct. It is easy to infer that Mr. Morton finds his position in life pleasant and to his taste. He is firm of purpose and clear in intention, but would yield to a logical and convincing argument. He is in no way eccentric or imaginative. Has some touch of originality. Is not ordinarily wasteful or extravagant, but expenditure for the attainment of what he might consider a good end would be a virtue rather than a fault in his eyes. He has a very ready appreciation of the pleasing and beautiful.

SIR EDWIN ARNOLD.

From the hand of Sir Edwin Arnold—a writer so lofty in thought, so finished in execution—we may look for a high type of poetic appreciation and artistic taste. Indications of an analytical mind, with clear reasoning power, logical sequence of idea, critical and intuitive deduction in marked degree, candor, versatility, observation, discrimination, and original thought are very clear. Good judgment is apparent and a keen sense of form and artistic taste. Great ardor. The high ideals of a refined, ready imagination and a cultivated, ambitious mind. Ideals that will scarcely be attained in full, for so great is ambition, so strong imagination, that the goal will be ever distant, fleeing to loftier heights as the traveler fares onward and upward. He is graceful and fluent in speech, agreeable in conversation. Composes with facility, but not the facility of vivid impulse, but rather the ease of culture, carefulness, and assured knowledge of the subject in hand. He is a persevering and ascending worker, and has great capacity for taking pains. Is economical in effort. It is fair to infer that Sir Edwin Arnold would not engage in the formulation of any literary subject until his mind had been swept, garnished, and well furnished, but once prepared, his well regulated brain would work with rapidity and precision. His is a handwriting sometimes termed lucky, but luck, be it remembered, is often but the result of energy, persevering in a definite direction. He is kindly, but firm, with much tenacity of purpose and staying power. Is tactful, persevering, and ambitious, and shows that quality of pride and self-respect unfailing in one who has tasted success. Lastly, he has a poetic and graceful temperament, is calm and a lover of ease, with keen appreciation of all that is pleasing to the senses. A dreamer, a poet, who, lapped in soft sounds, soothed by sweet odors, could drift upon clouds of incense to a very Nirvana of peace.

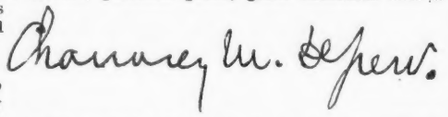
So surely does graphology reflect the temper of the mind, that to publish a reading from the hand of Sir Edwin Arnold is only to add, by way of welcome, one more tribute to the many already laid at the feet of this refined and poetic writer.

J. S. FASSETT.



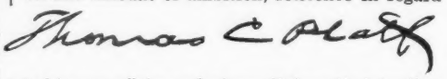
An intelligent and ready mind with fluent speech. A kindly temperament with a touch of something sympathetic and appreciative. Practical energy that does not easily tire, ardent ambition, tact, and self-possession and much tenacity with activity, are the suggestions made by the signature of Mr. Fassett.

CHAUNCEY M. DEPEW

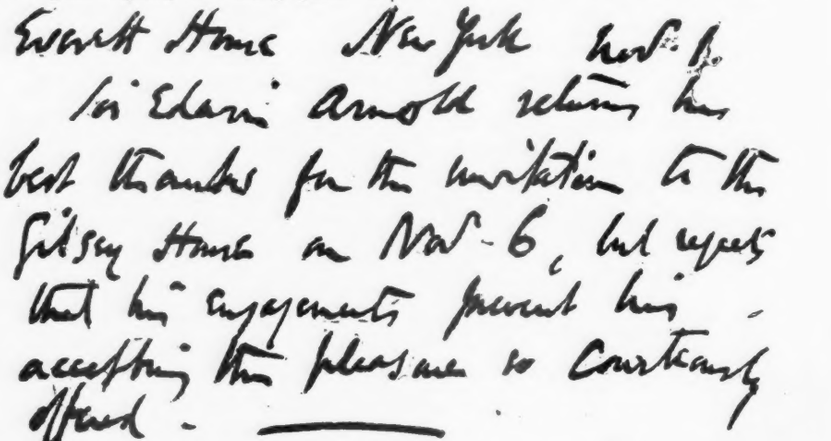


shows a cool and deliberate temperament, that would well calculate a chance and not be easily disconcerted. Ready fluency and connected ideas, but not the fluency of impulse, rather that of mental coolness and great presence of mind. Self-esteem, personal pride, great ambition and a desire to win, but also caution and reticence, are visible. He is very capable of keeping his own counsel. Intelligence, education, and good taste are evident; also good nature and a bit of finesse. Mr. Depew has calm strength of will and great self-control.

THOMAS C. PLATT.



From the signature of Mr. Platt may be read a certain amount of ambition, reticence in regard to his own affairs and plans, diplomatic intention and caution. He is uncommunicative in general, but sufficiently ready of idea. Is not an idealist or imaginative, but would probably show considerable determination in the pursuit of an object should his ambition be once aroused.



Everett House New York Nov. 6
Sir Edwin Arnold returns his best thanks for the invitation to the Sidney House on Nov. 6, but regrets that his engagements prevent his accepting the pleasure so courteously offered.

Fill out the blank printed on the back of the colored supplement published with this issue of THE AGRICULTURIST, and mail same with **$1.60** to

Publishers of "FRANK LESLIE'S WEEKLY,"
110 FIFTH AVENUE,
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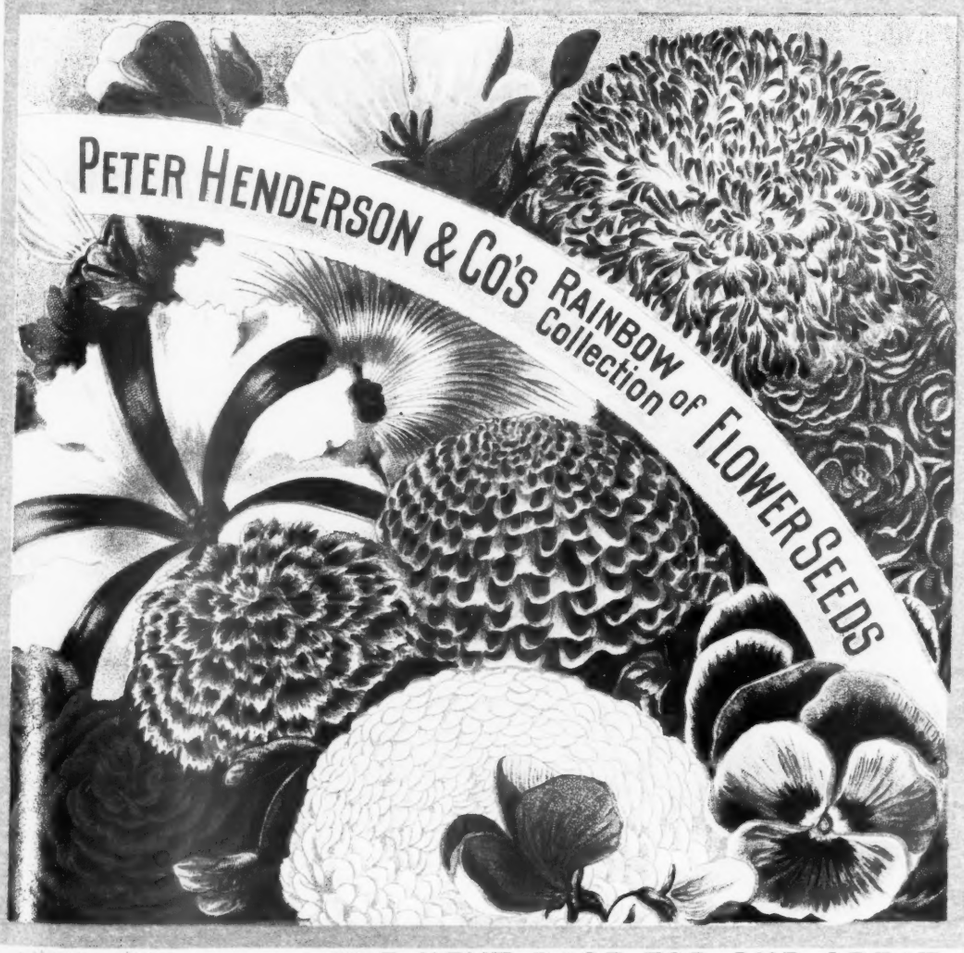
WHILE the above collection of plants can be sent with perfect safety now, and can with very little trouble be grown along in the house until the planting-out season, yet when so desired, we will hold the plants until the proper time for setting them out in the Spring, which in the latitude of New York would be about May 10th. We would advise, however, everyone to get them as early as possible, as by so doing, they can be grown to a much larger size before the planting-out season arrives. A pamphlet containing complete cultural directions will be sent free with each collection of the above plants.



THE

"Rainbow Collection"

OF

Flower Seeds,

CONTAINS TWENTY-FIVE BEAUTIFUL AND DISTINCT VARIETIES, EACH SEPARATELY PUT UP IN A HANDSOMELY LITHOGRAPHED PACKET SHOWING THE FLOWER.

THESE are put up for us on special contract by MESSRS. PETER HENDERSON & CO. OF NEW YORK, well-known seedsmen and florists, and are guaranteed by them to be of the same unrivalled quality for which they are famous, and the same as used by them for their high-class and critical trade.

This RAINBOW COLLECTION OF FLOWER SEEDS is composed of twenty-five of the most beautiful and distinct varieties, all of which will attain perfection and bloom luxuriantly the first season from seed. Twenty-one of these are for flower-beds and will produce a wealth of bloom and gorgeous masses of color from early Summer until cut down by frost; the other four varieties are climbers which will also bloom and attain full perfection the first season from seed and in a few weeks' time cover trellises, piazzas, arbors, fences and old trees or other desired objects, adding a grace and beauty to the surroundings in addition to their usefulness for shade.

In short, this RAINBOW COLLECTION OF FLOWER SEEDS has been especially selected by Messrs. Peter Henderson & Co. for ease of culture, certainty of growth and luxuriance of bloom for every one, and to give the greatest variety of form, color and perfume throughout the entire season. We illustrate above a few of the flowers contained in the RAINBOW COLLECTION.

Full cultural instructions are printed on each packet. The names of the varieties contained in this collection are as follows:

Alyssum, Sweet.
Aster, double mixed.
Balsam, double mixed.
Calliopsis, mixed (Coreopsis).
Candytuft, mixed.
Calendula, Meteor.
Chrysanthemums, annual mixed.
Convolvulus, mixed (Morning Glory).
Cypress Vine, mixed.
Dianthus, double mixed (China Pink).
Eschscholtzia, mixed (California Poppy).
Larkspur Rocket, double mixed.
Marigold, French, double mixed.
Marvel of Peru, mixed.
Mignonette, large flowering.
Nasturtium, climbing mixed.
Pansy, mixed.
Petunia, mixed.
Phlox Drummondi, mixed.
Poppy, double mixed.
Portulaca, mixed.
Stocks, Ten Weeks, double mixed.
Sun Flower.
Sweet Peas, mixed.
Zinnia, double mixed.

SEE NEXT PAGE FOR OUR GREAT OFFER.

A GREAT OFFER! WE GIVE THE PLANTS. YOU PICK THE FLOWERS.

"FRANK LESLIE'S ILLUSTRATED WEEKLY,"
12 times a year, including the CHRISTMAS NUMBER, Value $1.25
One Year's Subscription to the
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An Order on PETER HENDERSON & CO.
for PLANTS or SEEDS, Value $1.25
ONE GRAPHOLOGICAL CHART
or Reading of Character from Your Handwriting, Value $1.00
A TOTAL VALUE OF $5.00

ALL FOR $1.60

THE publishers of **"Frank Leslie's Illustrated Weekly"** have made an arrangement with the publishers of the **"American Agriculturist"** and with **Peter Henderson & Co.**, the well-known florists and seedmen, whereby they will give to anyone remitting them **$1.60**, a year's subscription to the new colored edition of **"Frank Leslie's Weekly"** (published the first week in every month and including the handsome Christmas Number), also a year's subscription to the "AMERICAN AGRICULTURIST," an order on PETER HENDERSON & CO., for $1.25 worth of PLANTS or SEEDS, good until June 1, 1892, and one GRAPHOLOGICAL CHART or reading of the subscriber's character from a specimen of his or her handwriting.

"Frank Leslie's Weekly" is the best illustrated paper in America, and its special colored edition is the handsomest thing of its kind in illustrated journalism. It contains special features, making it particularly attractive to the home circle. Its Ladies' and Children's Departments are in charge of one of the brightest and most entertaining woman writers on the American press, while its famous Graphological Department is conducted by a lady who has devoted years of study and research in fitting herself for the duties of this fascinating and subtle art.

The well-known standing of **"Frank Leslie's Weekly,"** of **Peter Henderson & Co.**, and of the **"American Agriculturist" is a sufficient guarantee of the good faith of the offer made above.**

Fill out the blank printed below and send it to the **Publishers of "Frank Leslie's Illustrated Weekly," 110 Fifth Avenue, New York City,** with **$1.60** (postal note, check or draft), and at the same time write on a separate sheet of paper in your own handwriting about 20 lines of original composition, marking this: "GRAPHOLOGICAL DEPARTMENT, FRANK LESLIE'S WEEKLY," and signing it either with your initials or your full name, as you prefer. (The answer or reading of character will be published in the **"Leslie"** the first special issue after receiving the subscription). You will then receive the two papers for a year as above and the order for seeds or plants.

On the other side of this sheet is shown a group of Roses, Chrysanthemums and Flowering Seed Plants. The subscriber will be entitled to either the 4 Rose Plants ("The Dinsmore," "Mrs. Degraw," "Madam Hoste" and "Perle des Jardins"), the 4 Chrysanthemum Plants ("Dawn," "Golden Plume," "Bohemia" and "Mrs. Alpheus Hardy"), or a package of assorted flower seeds of the best varieties, as shown on the plate. He should state which of these three choices he wishes when filling out the blank.

PUBLISHERS "FRANK LESLIE'S ILLUSTRATED WEEKLY,"
110 FIFTH AVENUE, NEW YORK.

I enclose One Dollar and Sixty Cents ($1.60), for which please send me, one copy, one year of

"FRANK LESLIE'S ILLUSTRATED WEEKLY"—SPECIAL COLORED EDITION (12 TIMES A YEAR).

"AMERICAN AGRICULTURIST."

AN ORDER ON PETER HENDERSON & CO. FOR .....

[Here state whether you want the 4 Roses, the 4 Chrysanthemums or the Package of Flower Seeds.]

ONE GRAPHOLOGICAL CHART OR READING FROM THE SPECIMEN OF MY HANDWRITING.

It is understood that I am to receive all of the above without any further cost to me.

Name .....

Address .....

MATTERS OF BUSINESS.

Notice to Our Readers.

It is with no little pride that the publishers call attention to the advertising columns of this issue of the AMERICAN AGRICULTURIST. The liberal patronage extended to it bespeaks the confidence that live and progressive advertisers throughout the entire country have in "the old, reliable AMERICAN AGRICULTURIST." The number of advertisers in this issue is upward of 295, and their advertisements occupy 10,598 agate lines of space, representing nearly every branch of industry connected with American agriculture and domestic life. While duly appreciative of this expression of continued confidence on the part of our advertisers, we shall also feel grateful to our readers, if, when writing advertisers, they will kindly mention where they saw the advertisement. By doing this our readers will receive prompt attention, and the very lowest prices.

The Prices of the Crops of 1891.

The returns of the statistical reporters of the Department of Agriculture for December, duly consolidated, make the average farm value of the current crops of the year—corn, 42.2 cents per bushel; wheat, 85.3; rye, 77.4; barley, 54.0; oats, 32.2; buckwheat, 57.9; potatoes, 37.1; tobacco, cigar leaf, 14.1 per pound; manufacturing and export leaf, 7.5 cents; hay, $8.39 per ton.

The price of corn is 2.9 more than the average of ten years from 1880, and only four-tenths of a cent less than the average for the decade from 1870. In the States of largest production, prices are as follows: Ohio, 41 cents; Indiana, 38; Illinois, 37; Iowa, 30; Missouri, 38; Kansas, 34; Nebraska, 26 The latter State, where corn is cheapest, has reported a higher value only four times in fifteen years. The average value of the whole crop, since 1883, has been higher only in 1887 and 1890, when the yield was only about twenty bushels per acre.

The value of the wheat crop is 2.5 cents per bushel higher than the average of ten years from 1880, and has been exceeded only once (in 1888) since 1883. In the States of the Atlantic Coast, and those on the Gulf of Mexico, except Texas, the value is from $1 to $1.15; in the Ohio Valley, from 85 to 96 cents; beyond the Mississippi, from 70 cents in North Dakota to 81 cents in Iowa.

Only once since 1883 has the price of oats been as high as at present, 32.2 cents, which is 1.3 cents higher than the average of ten years from 1880. The prices of all cereals have been remarkably sustained in view of the abundance of production.

The Cotton Returns of December to the Department of Agriculture, relate to average prices on plantations. The complaint of unremunerative values is general, and the declaration frequent that the crop does not return cost of production. A feeling of discouragement pervades the report, and a disposition to reduce area is expressed. The plantation price, which is the actual rate for cotton sold at the gin, averages 7.3 cents per pound. For five years preceding, the range was from 8.1 to 8.6 cents, and averaged nearly 8.4 cents This decline is echoed in the records of exportation, which averaged in October a value of 8.9 cents against 10.11 cents for October of last year, a drop of 12 per cent. The State averages are as follows: Virginia, 7 cents; North Carolina, 7.4; South Carolina, 7.4; Georgia, 7.4; Florida, 7.3; Alabama, 7.3; Mississippi, 7.3; Louisiana, 7.3; Texas, 7.0; Arkansas, 7.3; Tennessee, 7.3. An almost unexampled season

(*Continued on Page* 83.)

Butter at the World's Fair.

Dairy interests will have a big share in the World's Fair at Chicago.

And it is time now for butter makers to be making efforts to improve their product, and keep the credit of making "the best butter in the world," where it belongs—in the United States.

At the Paris Exposition, the gold medal for butter was awarded to Moulton Bros. of Randolph, Vt. Wells, Richardson & Co.'s Improved Butter Color was used in this butter, and the AMERICAN AGRICULTURIST hazards the prediction that the best butter at Chicago in '93 will be colored with this same Improved Color.

The manufacturers offer to mail enough of this color to make 60 pounds of butter, a June shade, to any reader of the AMERICAN AGRICULTURIST on receipt of six cents in stamps. Write to them at Burlington, Vt., and get some of the color that was in the first prize butter at Paris.

The Stable Shelf

ought to have on it a bottle of Phénol Sodique for bruises, cuts, sore spots, &c.

Just as good for a man.

If not at your druggist's, send or circular.

HANCE BROTHERS & WHITE, Pharmaceutical Chemists, Philadelphia.

Look out for counterfeits. There is but one genuine. Better cut the advertisement out and have it to refer to.

POULTRY for PROFIT Is the Teaching OF THE Best Poultry Paper.

FARM-POULTRY Is the Name of It.

A Live, Practical Poultry Raising Guide.

It Costs Only 50 Cents per Year.

Six Months 25c. Sample Free.

Send for **Index** to last Vol. **free**; and judge yourself, if as much complete, instructive, practical matter regarding poultry raising and how to obtain the best market prices can be found in any volume costing four times the price of FARM-POULTRY one year. **Subscriptions can begin** with **any** back number desired.

Are you keeping poultry for profit, either in large or small numbers? No matter if you keep only a dozen hens; are they paying you a profit over and above their keep, and the eggs used in your own family? **Do you care to learn** how others make their hens pay $2.50 each per year from eggs alone? Then subscribe to FARM-POULTRY. **"What has been done, can be done again."** **Remember** the price; one year, 50 cts; six months 25 cts; sample **free**. **Remit** cash or stamps. **I. S. JOHNSON & CO., Boston, Mass.**

HAIR ON THE FACE, NECK, ARMS OR ANY PART OF THE PERSON

QUICKLY DISSOLVED AND REMOVED WITH THE NEW SOLUTION

MODENE

AND THE GROWTH FOREVER DESTROYED WITHOUT THE SLIGHTEST INJURY OR DISCOLORATION OF THE MOST DELICATE SKIN.

Discovered by Accident.—IN COMPOUNDING, an incomplete mixture was accidentally spilled on the back of the hand, and on washing afterward it was discovered that the hair was completely removed. We purchased the new discovery and named it MODENE. It is perfectly pure, free from all injurious substances, and so simple any one can use it. It acts mildly but surely, and you will be surprised and delighted with the results. Apply for a few minutes and the hair disappears as if by magic. It has no resemblance whatever to any other preparation ever used for a like purpose, and no scientific discovery ever attained such wonderful results. **IT CANNOT FAIL.** If the growth be light, one application will remove it permanently; the heavy growth such as the beard or hair on moles may require two or more applications before all the roots are destroyed, although all hair will be removed at each application, and without the slightest injury or unpleasant feeling when applied or ever afterward.—MODENE SUPERCEDES ELECTROLYSIS.—

—RECOMMENDED BY ALL WHO HAVE TESTED ITS MERITS—USED BY PEOPLE OF REFINEMENT.—

Gentlemen who do not appreciate nature's gift of a beard, will find a priceless boon in Modene which does away with shaving. It dissolves and destroys the life principle of the hair, thereby rendering its future growth an utter impossibility, and is guaranteed to be as harmless as water to the skin. Young persons who find an embarrassing growth of hair coming, should use Modene to destroy its growth. Modene sent by mail, in safety mailing cases, postage paid, (securely sealed from observation) on receipt of price, **$1.00** per bottle. Send money by letter, with your full address written plainly. Correspondence sacredly private. Postage stamps received the same as cash. (ALWAYS MENTION YOUR COUNTY AND THIS PAPER.)

LOCAL AND GENERAL AGENTS WANTED. **MODENE M'F'G CO., CINCINNATI, OHIO, U. S. A.** **Manufacturers of high grade hair preparations.** *Register your letter at any Post-office to insure its safe delivery* CUT THIS OUT AS IT MAY NOT APPEAR AGAIN

We offer $1.000 for failure or the slightest injury. EVERY BOTTLE GUARANTEED.

Salesmen Wanted

To sell our Fruit and Ornamental Stock. Good pay. Steady winter work. Outfit free. Address for terms,
E. B. Richardson & Co., Nurserymen, Geneva, N. Y.

"THE NEW METHOD"

for good health cures all chronic diseases.
Rev. A. Albro, D.D., Utica, N. Y., writes: "One of the greatest boons to mankind in modern days." Infinitely better than the Hall System. Half the price. Send for testimonials.
HEALTH SUPPLIES CO., 710 BROADWAY, N. Y.

THE WASHING MACHINE that never disappoints is **"The World's Washer."** Information free. Never buy a Washing Machine until you learn about this one Write to **C. E. ROSS**, Lincoln, Ill.

Bargains in PRINTING PRESSES, Type & Materials. Outfits from $3 up. Send 2c. stamp for list. Illus Catalog, 116 pages, 15c. **100** Fine Chrome Scrap-book Cards & Card Case, **25c.** 10 Birthday Cards, 25c. Samples, 10c. GITHENS & BRO., Box 1632, Phila, Pa

AGENTS WANTED

To sell GARDNER'S celebrated

ECONOMY ROASTER,

BAKER AND STEAMER.

Saves 1/3 cost in one month Richest flavors and juices retained. Sample by mail, **$1.00.**
T. A. GARDNER, South Vineland, N. J.

NO TRUSS

In the Rupture or give Relief like **Dr. Pierce's Magnetic Elastic Truss.** This Celebrated Truss has **radically cured** thousands of cases. No Iron Hoops or Steel Springs. It can be worn with ease and comfort **Night and Day.** Perfect fitting Trusses sent by Mail. Avoid Imitations! If you want the **BEST,** send 4c in stamps for Pamphlet **No. 1.** Address all letters to **Magnetic Elastic Truss Co.** [DR. PIERCE & SON] SAN FRANCISCO, CAL. or SAINT LOUIS, MO

FOUND

in Galveston, T., an old coin worth.

$5.000.

A Boston Baker sold 149 old coins

$13.389

We can prove that others have done nearly as well. **Coin collecting pays big.** If you have any Old Coins or Proofs coined before 1878, save them, as they might be worth a fortune. Illustrated circulars on rare coins free at office or mailed for two stamps.

AGENTS WANTED. **Numismatic Bank**, Court St., Boston, Mass.

When writing to advertisers, be sure and mention the
AMERICAN AGRICULTURIST.

FARMS CHEAP THE FINEST, RICHEST SOIL IN THE WORLD. NO BLIZZARDS, NOR DESTROYING CYCLONES. LONG LINE OF EXPENSIVE FREIGHTS, BUT THE **BEST PAYING MARKETS** right at the door for farmers in Michigan. How to get a farm cheap; long time, easy payments and full information, address **O. M. BARNES, LANSING, MICHIGAN.**

GOOD LUCK WITH SEEDS

is a matter of choice. You get the luck if you get the right seeds. Ours are all lucky seeds, just because we trust nothing to luck. We are always trying, testing, proving, so that we can sell you only seeds that will grow, and only the varieties that it PAYS to grow.

Would you like a list with all the "unlucky seeds" left out? That's our MONEY GROWER'S MANUAL,—the cream of flower and vegetable seeds. Many valuable novelties,—but all TESTED. It is FREE if you send two 2c. stamps for postage, and mention CAN AGRICULTURIST

JOHNSON & STOKES, 217 and 219 MARKET ST. PHILADELPHIA, PA.

SPRAYING OUTFITS PERFECTION

Best, Latest Improved and Cheapest. Our Perfection and Empire Pumps stir the liquid automatically and will spray 100 Trees Per Hour. We make the Little Gem and Garfield Knapsack Sprayers and the Vermorel, fine spray nozzle, most economical spray nozzle in the world. Also a Horse Power Sprayer at low price. We sell Sulphate of Copper, Paris Green and London Purple at wholesale prices. Catalogue free. Write address plainly, giving county. **FIELD FORCE PUMP CO.** 160 Bristol Ave. **LOCKPORT, N.Y.**

SPRAY YOUR FRUIT TREES AND VINES

Wormy Fruit and Leaf Blight of Apples, Pears, Cherries, Grape and Potato Rot, Plum Curculia prevented by using EXCELSIOR SPRAYING OUTFITS.

PERFECT FRUIT ALWAYS SELLS AT GOOD PRICES. Catalogue showing all injurious insects to Fruits mailed free. Large stock of Fruit Trees, Vines, and Berry Plants at Bottom Prices. Address WM. STAHL, Quincy, Ills.

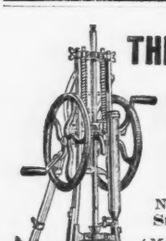
MAKE HENS LAY

NOTHING ON EARTH WILL MAKE HENS LAY LIKE SHERIDAN'S CONDITION POWDER.

WE SEND BY MAIL A LARGE 2¼ POUND CAN FOR $1.20, TWO SMALL PACKS 50 CTS POST PAID.

Sheridan's Condition Powder

is absolutely pure and highly concentrated. One ounce is worth a pound of any other kind. Strictly a medicine, to be given in the food, once daily, in small doses. Prevents and cures all diseases of hens. Worth its weight in gold when hens are moulting, and to keep them healthy. Testimonials sent free by mail. Ask your druggist, grocer, general store, or feed dealer for it. If you can't get it, send at once to us. Take no other kind. We will send postpaid by mail as follows:—A new, enlarged, elegantly illustrated copy of the "FARMERS' POULTRY RAISING GUIDE" (price 25 cents; tells how to make money with a few hens), and two small packages of Powder for 60 cents; or, one large 2 1-4 pound can and Guide, $1.20. Sample package of Powder, 25 cents, five for $1.00. Six large cans, express prepaid, for $5.00. Send stamps or cash. I. S. JOHNSON & CO., 22 Custom-House Street, Boston, Mass.

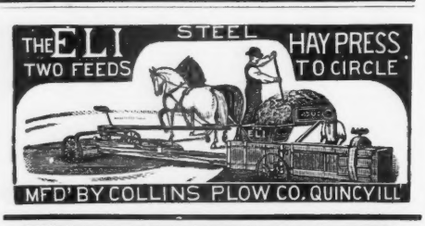


THE VICTOR

Rock Drill, Well Borer, and PROSPECTOR,

Now Greatly Simplified, Strengthened and Improved.

(Mention this paper.) For circulars, address **W. WEAVER,** 1605 S. Broad St., Philadelphia, Pa.



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SHIPPED ANYWHERE TO OPERATE ON TRIAL AGAINST ALL OTHERS
PURCHASER TO KEEP ONE DOING MOST AND BEST WORK
GEO. ERTEL & CO. QUINCY, ILL

ST. LOUIS MACHINE & TOOL CO.

MO., U. S. A.

CATALOGUE FREE.

CIDER PRESSES!

SEND FOR FREE CATALOGUE.

C. H. STEWART, 193 Lake St., Chicago, Ill.

EMPLOYMENT. Ladies and Gentlemen wanted to sell the "New Model Hall Typewriter." Sample easily carried in the hand. Work easy, pleasant and lucrative. Salary or commission. Machine unexcelled. Price lower than any standard writer. Address N. Typewriter Co., Boston, Mass.

When writing to advertisers, be sure to mention the AMERICAN AGRICULTURIST.

$500 FOR A TOMATO!

Last spring I offered $500 to any person producing a 3 lb. **Mammoth Prize Tomato!** T. R. Harris Abbott, Neb., won it with one weighing 3 lbs. 3½ ozs., and I sent him my check for $500. It measured over 8½ in. in diameter. 37 tomatoes grew on one stem over 3 feet from the ground. Largest plant on record **13 ft. 6 in.** tall. This mammoth strain creates a sensation wherever it goes, and is the largest ever offered. Thousands of my customers have grown them to weigh over 45 ozs. The quality is excellent; after you once test it you will grow no others. If well cared for they will produce 1 bu. to a plant (see cut) of large, smooth, bright red tomatoes, very solid with only a few seeds in each, and entirely free from rot. If started early, fruit ripens from July 4th until frost. This year I offer **$500 Cash** to any person producing a 3½ lb. tomato. (It can be done.) Full directions how Mr. Harris grew his with each order. Plant some, you may win the prize. All my seed is saved from large specimens.

SURE HEAD CABBAGE

Is all head and sure to head, very uniform in size, firm and fine in texture, excellent in quality and a good keeper. Single heads have weighed over 64 lbs.

EARLY SNOWBALL TURNIP

Is the earliest in the world, easy grown, good size, excellent quality. Will be far ahead of your neighbors.

My Catalogue, is worth 50 cts. to any one who gets it. $500 offered largest order; $500 for a pansy blossom; $300 for a bean plant with 100 pods, and above tomato prize.

☞I will send a packet each of Prize Tomato, Cabbage and Turnip, with my **Catalogue of Bargains** for only 25 cents. Greatest bargain catalogue ever sent out.

☞Every person sending silver for above collection, will receive **Free** a packet **GOLDEN BALL LETTUCE,** finest variety ever grown, and a $5 cent certificate for seeds, your choice from my bargain catalogue **FREE.**

F. B. MILLS, Rose Hill, Onondaga County, N.Y.

10 COMPLETE NOVELS FREE!

Upon receipt of **Twelve Cents** in postage stamps we will send THE PEOPLE'S HOME JOURNAL for **Three Months,** and to each subscriber we will also send, **Free** and post-paid, **10 Popular Novels,** each one of which is published *complete* in neat pamphlet form, as follows: *An Island Pearl,* by B. L. Farjeon; *The Scarlet Cross,* by Clara Augusta; *Her Manifest Destiny,* by Amanda M. Douglas; *A False Scent,* by Mrs. Alexander; *The Pearl of the Orient,* by Sylvanus Cobb, Jr.; *A Modern Cinderella,* by the author of "Dora Thorne"; *Dolores,* by Mrs. Jane G. Austin; *Falsely Accused,* by Mrs. Ann S. Stephens; *Clouds and Sunshine,* by Charles Reade; *The Sorrow of a Secret,* by Mary Cecil Hay. THE PEOPLE'S HOME JOURNAL is a large 16 page, 64 column illustrated literary and family paper, filled with everything to amuse, entertain and instruct the whole family. Serial and Short Stories, Sketches, Poems, Useful Miscellany, Fancy Work, Household, Juvenile and Humorous Departments. Serial stories by Mrs. Southworth and Mrs. Mary J. Holmes have just been commenced. It is the best story paper published. We want 100,000 new trial subscribers—that is why we make this great offer. It is the biggest twelve cents' worth ever given—you will get five times your money's worth. Send for this great offer, and if you are not satisfied we agree to return your twelve cents and make you a present of all. Six subscriptions, with the ten novels to each, sent for 60 cents. We refer to the Mercantile Agencies and to any newspaper published in New York City as to our reliability. Address, **F. M. LUPTON, Publisher, 106 & 108 Reade Street, New York.**

GOLD MEDAL, PARIS, 1878.

W. BAKER & CO.'S Breakfast Cocoa

from which the excess of oil has been removed,

Is absolutely pure and it is soluble.

No Chemicals

are used in its preparation. It has *more than three times the strength* of Cocoa mixed with Starch, Arrowroot or Sugar, and is therefore far more economical, *costing less than one cent a cup.* It is delicious, nourishing, strengthening, EASILY DIGESTED, and admirably adapted for invalids as well as for persons in health.

Sold by Grocers everywhere.

W. BAKER & CO., Dorchester, Mass.

JOSEPH GILLOTT'S STEEL PENS.

GOLD MEDAL, PARIS EXPOSITION, 1889.

THE MOST PERFECT OF PENS.

FERTILIZER MACHINERY

Crushers, Mills, Mixers, Digesters, Dryers, etc. Complete Fertilizer Works designed, erected and started.

C. H. DEMPWOLF & CO., York, Pa.

$5 A DAY SURE. $2.15 Samples free. Horse owners buy 1 to 6. 20 other specialties. **E. E. BREWSTER,** Holly, Mich.

MATTERS OF BUSINESS.

(*Continued From Page* 81.)

for harvesting is reported, with picking, ginning, and marketing far advanced. While the fiber is at many points short, it is clean and of good color. This favorable weather has caused the receipts from plantations from September 1st to December 18th to aggregate 4,890,869 bales, against 4,456,242 bales last year, and 4,254,658 bales in same time of 1889.

The Egyptian crop is also a liberal one, the receipts at Alexandria, from September 1st to December 16th, having been 2,859,000 cantars (98 pounds each) as against 2,347,000 last year, and 2,102,000 in 1889. The Indian crop, on the contrary, appears to be short, as Bombay's receipts are only 109,000 bales to December 17th, against 84,000 bales last year, and 252,000 bales same time in 1889. Bombay's exports, however, show an increase of 10,000 bales so far this season, while Egypt's exports to December 16th were 236,000 against 194,000 bales last year and about the same quantity during the like period of the previous year. Official reports combine the shortage in India, and estimates the 1892 crop as reduced from 12,000,000 to 9,000,000 acres. This curtailment of area is not believed in some circles.

It is evident that spinners' supplies are much less than at this time last year, both in the United States and England. If, therefore the domestic crop is short, as its future movement will show, a grand scramble for cotton and consequent higher prices may be expected.

Poor Prospects for Winter Wheat.—The returns to the United States Department of Agriculture of the conditions of the coming crops of winter grains are not generally favorable. On the Atlantic coast some injury is reported on early sown areas from the Hessian fly. The season was not favorable for seeding in the South, on account of continued dry weather, and germination was slow from the same cause. Rains in the late autumn have improved the prospect. In the Western States seeding was late, the seed bed hard and cloddy, germination slow, and growth feeble until November, when material improvement was seen in most fields. In some districts the Hessian fly made its appearance, causing some damage. The condition of rye is a little higher than that of wheat, making an average of 88.8. The falling off in December condition of wheat best appears from this comparison:

	'91	'90	'89		'91	'90	'89
Ohio.....	80	101	95	California..	97	....	99
Michigan...	92	101	78	New York..	97	100	97
Indiana.....	81	102	95	Pennsylv'ia	92	99	97
Illinois.....	80	96	98	Maryland...	87	92	92
Iowa.....	92	....	....	Virginia....	86	94	99
Missouri....	73	95	97	Georgia.....	96	98	100
Kansas.....	75	97	96	Texas.....	70	101	96
Nebraska...	93	....	....	Un'td States	85.3	98.4	95.3

Personal, Agricultural, Commercial.

Harris' Rural Annual for 1892—Will be sent free to all readers of the AMERICAN AGRICULTURIST who send their address to Joseph Harris Co., Moreton Farm, Monroe Co., N. Y.

A Salary with expenses paid will come handy to any one who is now out of employment; especially where no previous experience is required to get the position. If you want a position, see advertisement on page 76, "A Chance to Make Money."

Pennsylvania Horticulture.—The annual meeting of the Pennsylvania Horticultural Association will be held January 20th and 21st at York, Pa. Programmes and full particulars may be obtained from the secretary, Mr. B. E. Engle, Waynesboro, Pa.

Nitrate of Soda as a Fertilizer.—If you wish reliable directions for the use of nitrate of soda as a fertilizer, you will find them in Harris' Rural Annual for 1892, just published. It is free to all readers of the AMERICAN AGRICULTURIST. Send for it. It is full of valuable information. Address Joseph Harris Co., Moreton Farm, Monroe Co., N. Y.

A Durable Wind Mill.—In no farm machinery is durability of more importance than in a wind mill. No matter what its good qualities may be, if it is not durable, it is too dear at any price. The Keith wind mill, manufactured by James C. Keith, Battle Creek, Mich., is noted for the excellence of the material used in all parts of it, its general durability, and the ease with which it can be put up and controlled.

Bath Tub for Every House.—The problem, how to furnish bathing facilities in house not provided with hot and cold water pipes, and sewers has been effectively solved by the intro-

[*Continued on Page* 84.)

1892—*NOW IS THE TIME TO SUBSCRIBE.*—1892

"THE BEST PERIODICALS FOR FAMILY READING."

Harper's Magazine.

$4 per Year.

HARPER'S MAGAZINE will celebrate the fourth Centenary of the Discovery of America by its *re-discovery*, through articles giving a more thorough exposition than has hitherto been made of the **Recent Unprecedented Development of our Country**, especially the **Great West.** Articles will also be given on the **Dramatic Episodes of American History.**

The probable **Field of the Next European War** will be described in the Series of Papers **From the Black Forest to the Black Sea,** by POULTNEY BIGELOW and F. D. MILLET, superbly illustrated by Mr. MILLET and ALFRED PARSONS. Papers will also be given on the **German, Austrian, and Italian Armies,** illustrated, from studies made last summer in Europe, by T. DE THULSTRUP.

Mr. W. D. HOWELLS will contribute a new novel, **A World of Chance,** characteristically American. Especial prominence will be given to **Short Stories,** which will be contributed by T. B. ALDRICH, R. H. DAVIS, A. CONAN DOYLE, MARGARET DELAND, Miss WOOLSON, Miss WILKINS, and other popular writers.

Among the literary features will be **Personal Reminiscences of Nathaniel Hawthorne,** by his college classmate and life-long friend HORATIO BRIDGE, and a **Personal Memoir of the Brownings** by ANNE THACKERAY RITCHIE.

Harper's Weekly.

$4 per Year.

HARPER'S WEEKLY for the coming year will contain more attractive features, more and finer illustrations, and a greater number of articles of live, intense interest than will be found in any other similar periodical. Among these latter will be a series of articles on the **Twenty-five Greatest Cities of the World,** including five hundred illustrations. The **Columbian Exposition,** the **Army and Navy, Great Public Events, Disasters on Land and Seas,** and the **Doings of Celebrated People of the Day** will be described and illustrated in an appropriate and timely manner. The Department of **Amateur Sport** will continue under the direction of CASPAR W. WHITNEY. The best of modern writers will contribute short stories, and the most distinguished artists will supply illustrations. The editorials by Mr. GEORGE WILLIAM CURTIS will continue an attractive feature of the paper.

Harper's Bazar.

$4 per Year.

HARPER'S BAZAR is a journal for the home. It gives the latest information with regard to the Fashions, and its numerous illustrations, **Paris Designs,** and **Pattern-sheet Supplements** are indispensable alike to the home dress-maker and professional modiste. No expense is spared to make its artistic attractiveness of the highest order. Its bright stories, amusing comedies, and thoughtful essays satisfy all tastes, and its last page is famous as a budget of wit and humor. In its weekly issues everything is included which is of interest to women. The Serials for 1892 will be written by WALTER BESANT and WILLIAM BLACK. Mrs. OLIPHANT will become a contributor. MARION HARLAND'S Timely Talks, **Day In and Day Out,** are intended for matrons, and HELEN MARSHALL NORTH will specially address girls. T. W. HIGGINSON, in **Women and Men,** will please a cultivated audience.

Harper's Young People.

$2 per Year.

HARPER'S YOUNG PEOPLE, Vol. XIII., began on November 3, 1891. For the coming year this best and most comprehensive weekly in the world for youthful readers offers a varied and fascinating programme. In serial fiction it will contain **Diego Pinzon,** a story of the first voyage of Columbus, by JOHN R. CORYELL; **Canoemates:** a Story of the Florida Reefs and Everglades, by KIRK MUNROE; another story by one of the best known and most popular of American authors; and stories in three and four parts by THOMAS NELSON PAGE, E. H. HOUSE, ANGELINE TEAL, ELLA RODMAN CHURCH, and MARY S. MCCOBB. More than **Two Hundred Short Stories,** by favorite writers, **Articles on Travel, Out-of-door Sports, In-door Games,** and all subjects dear to the hearts of the young, besides hundreds of illustrations by leading artists, will combine to make HARPER'S YOUNG PEOPLE for 1892 more worthy than ever of the remarkable tribute from the pen of W. E. GLADSTONE, that **"It far surpasses all that the enterprise and skill of our publishers have been able to produce."**

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MATTERS OF BUSINESS.

(*Continued From Page* 83.)

duction of the combination folding bath tub, manufactured by the Combination Folding Bath Tub Co., Marshall, Mich. These tubs occupy less than two feet of floor space, and when folded are as ornamental as a nice dresser. It does not require a furnace or range to heat the water, as each tub is provided with a heating apparatus, for which may be used oil, gasoline or gas. A neat catalogue, issued by the company, gives clear illustrations and description of this valuable invention, and will be sent to all applicants.

Moseley's Occident Creamery. — In calling attention to the advertisement of Moseley's Occident Creamery, in this issue, we will remind our readers that portable creameries are useful in winter, as well as warmer seasons of the year. For circulars and introductory offer on the Occident, freight paid by makers, address Moseley & Pritchard M'f'g. Co., Clinton, Iowa.

Interesting Statistics.—There are at least one hundred persons in the United States maimed every day by accidents of all sorts. Mr. A. A. Marks, of New York, the well-known manufacturer of artificial limbs, states that, "Fully eighty-five per cent. of artificial limbs are legs, fifteen per cent. arms. Of legs, forty-nine per cent. are right, forty-six per cent. left, five per cent. both right and left. Seventy-eight per cent. of legs amputated are of males, and twenty-two per cent. are of females."

Good Seeds.—Good and bad seeds often have the same appearance. There is but one guarantee; the reliability of the firm from which you buy. That our advertisers, Messrs. D. M. Ferry & Co., of Detroit, Mich., are reliable is attested by the fact that millions buy seeds from them year after year. Their Seed Annual for 1892 is a model of its kind—illustrative, descriptive, priced. It contains information of great value to any one about to plant seeds. Sent free on application to the firm's address, Detroit, Mich.

Warranted Saws. — In hardly any other tool used on the farm or in the shop is quality of as much importance as in saws. That the name of Henry Disston & Sons stamped on a saw is the very best possible guarantee for excellence, is known the world over. But there is also a good deal in knowing how to use a saw properly and keep it in order. All these points are fully described in a neat pamphlet, which may be obtained free by addressing Henry Disston & Sons, Philadelphia, Pa.

To Prevent Horses from Slipping.—Owners of horses will be pleased to learn that by using the Blizzard Adjustable Horse Creeper the slipping of horses on ice and icy roads can be entirely prevented. The Blizzard consists of a light frame work of malleable iron fitted upon the inside of the shoe. It has four points of hardened steel and rests upon the ground, and can be put on and taken off in a few minutes. The calks, if they become dull, can be renewed for less than a cent a piece. Those who have this contrivance give it the highest commendation. It is manufactured by S. W. Kent, Meriden, Conn., whose advertisement appears on another page of this number.

Do the Old Grow Irritable? — Shelley says that old age is the most miserable corrupter and blighter of the sweetest charities of the human heart; and he seems to think that people must, of necessity, grow irritable as they grow in years. This is a mistake. Old persons whose blood is pure and whose livers remain active, are generally the most delightful persons we can meet. And there is no excuse for any one having impure blood or a torpid liver when they can procure Beecham's pills, for twenty-five cents a box. If your druggist does not have them, send to B. F. Allen Co., 365 and 367 Canal street, New York.

Over Sixty Years in the Thresher Business.—The Thresher & Engine Works of C. Aultman & Co. have been founded over sixty years. During these years hundreds of threshers and factories have come and gone while these works have continuously gained in public favor. Such a career of growth and success furnishes a more convincing guarantee of superior efficiency in operation than anything else could. The catalogue of this firm, just issued, is a handsome, artistic work giving photographic illustrations of all the leading threshers, stackers, engines, horse powers, mills, etc., manufactured by this renowned firm. These catalogues can be obtained by addressing C. Aultman & Co., Canton, O.

Teaching by Correspondence. — At Detroit, Mich., the Sprague Correspondence School of Law is conducting a Law School by the Correspondence method with splendid success. It is adapted to the wants of students who are unable to attend a law school—to those who are studying in offices where, by reason of the regular work of the office, little opportunity is had for guidance, instruction, examination, etc., such as is necessary to a thorough grounding in the law; and to those who have a few hours every day which might be profitably used at home in this pursuit. The method of instruction is thorough, personal, and direct, and the student is not left to himself, but is continually guided and proven in his work. See their advertisement in another column.

Mrs. Charles Frank,

North Syracuse, N. Y.

CURED

Of Neuralgia, Kidney and Liver Troubles, Call Stones, Nervous Prostration and Female Weakness in a Worst Form.

NORTH SYRACUSE, N. Y., Sept. 14, 1891.

DR. A. OWEN, Ill., *Dear Sir:*—After being worn out with pain for five years, and doctoring all those long years, I chanced to see Mrs Ella Trautman's statement in the National Tribune. As I read it, I thought, as a last resort, I would try one of your Electric Belts, for I had doctored with physicians in Syracuse, only receiving temporary relief, and began to think there was no hope for me. I purchased one of your No. 4 Electric Belts and found relief at once. I could feel my diseases gradually disappearing. It is now seven months since I commenced wearing the belt, and I have not taken a drop of medicine since the first day I commenced wearing it. I have worn the belt according to instructions every afternoon since I received it, and to-day I am thankful to you for your wonderful discovery. For two or three years I suffered with dyspepsia, had terrible pains in my side, my food refused to digest. Now I can eat almost anything without any distress in the stomach.

For two long years I did not have a good night's sleep. I was so dreadful nervous it seemed as if I would be wild. I used to tell my husband if I could not get rid of this nervousness I did not wish to live, as life was almost a burden. Worn out and completely discouraged, I at last found relief in your No. 4 Electric Belt, and that is more than doctors did for me. I also had severe pains in my head. At times I could hardly see one go around the room. I can not tell how much I suffered, but the belt has taken away all pain and nervousness and I can sleep good once more. When I began wearing the belt, I could hardly walk around the house, but after the first week I began to get stronger, and have continued to improve ever since, until to day I feel like a new person. The belt has given me new life and I can enjoy company once more. Doctor, you don't know how good it seems to get out. It seems as if I was let out of prison. My husband wears the belt in the forenoon for kidney trouble and it is helping him. He joins with me in their highest praise. If I could not replace it, I would not take any amount of money for my belt. I would not give my Electric Belt for all the doctors and drugs in Syracuse, if I could not get another. I would say to ladies, who are suffering from diseases peculiar to our sex, to try one of Dr. Owen's Electric Belts and you will find relief at once, for it did for me what medicines could not do, and I trust it will do the same for you. It will also take away that tired feeling and give you rest at night. Now, doctor, please accept my thanks. You have my permission to use this letter if you so desire. I feel it a duty to inform people of your wonderful discovery.

Yours respectfully, MRS. CHARLES FRANK.

NOTICE—The (only) Owen Electric Belt and Appliance Co. is incorporated under the Laws of the State of Illinois, with a cash capital of $50,000.00. President, Dr. A. Owen; Treasurer, S. M. Owen; Secretary, C. E. Meigs. The Main Offices, Head Salesrooms, and only Factory are located at 191-193 State Street, Chicago, Ill., with a branch office at 826 Broadway, New York City. We are in no way responsible for representations of agents or any other persons selling goods of our manufacture, or making contracts for advertising in our name. Customers purchasing from either of the above offices may rely on whatever representations are made.

Electricity is not Magnetism, hence do not confound this Electric Battery with the magnetic belts offered; there is no similarity or comparison in their remedial powers. Electricity can, will and does cure, while magnetism does not. Dr. A. Owen's Electric Belt is absolutely under the control and regulation of the patient.

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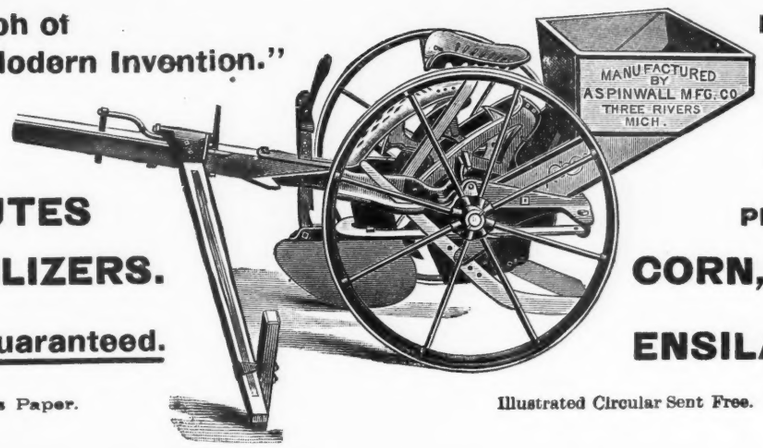

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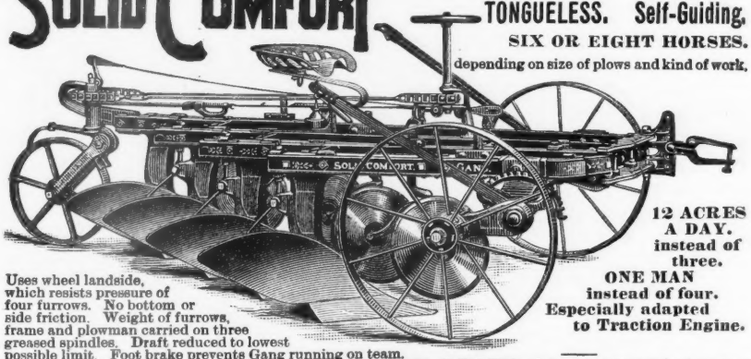

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Especially adapted to Traction Engine.

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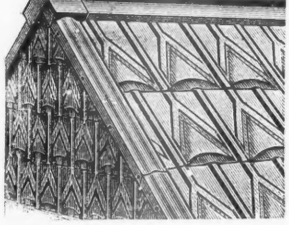

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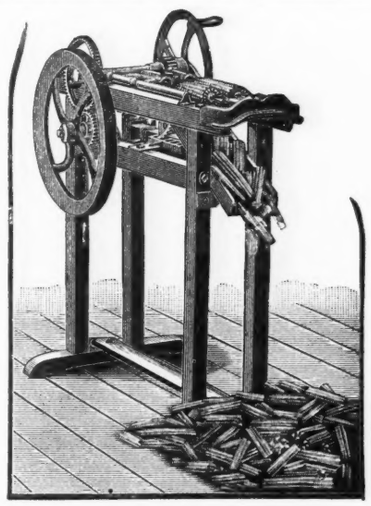

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Will prepare more food in same length of time than any two horse crusher. **Leaves all the corn on cob. Is simple, easy running and durable. Will save you money.** Is a storage power machine, gathering momentum between intervals of feeding. Money refunded after thorough trial, if unsatisfactory. Send for circular. Agents wanted.

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A Valuable Directory for Breeders.

For the first time in the United States is published below a complete list of the live stock record societies of England and Europe, as well as of the United States of America. These are the societies that have established registers in which to keep a record of pedigrees, so as to insure the purity of blood of the respective breeds. Agriculturists, in our own or other countries, who wish to secure thoroughbred stock, or who desire authentic information about the various improved breeds, will find this directory of immense value. In each case is given the name of the society, next, its secretary and his official address, and, lastly, the most recent volume of pedigrees published by each.

European Breeders' Associations.

HORSES.

The Jockey Club and the National Hunt Committee. Secretaries, the Messrs. Weatherby, Newmarket, England.

Shire Horse Society. J. Sloughgrove, 11 Chandos street, Cavendish Square, London W., England; Shire Horse Stud Book, Vol. XI., 1890.

Suffolk Stud Book Association. Fred Smith, Red House, Rendlesham, Woodbridge, England; the Suffolk Stud Book, Vol. V., 1890.

Cleveland Bay Horse Society of Great Britain and Ireland. William Scarth Dixon, Low House, Stanghow, Skelton, Yorkshire, R. S. O.

Hackney Horse Society. Henry F. Euren, 11 Chandos street, Cavendish Square, London W.; Hackney Stud Book, Vol. VIII., 1890.

Clydesdale Horse Society of Great Britain and Ireland. Archibald MacNeilage, 46 Gordon street, Glasgow; Clydesdale Stud Book, Vol. XII., 1890.

Select Clydesdale Horse Society of Scotland. William Law, 210 Kennedy street, Glasgow.

Hunters' Improvement Society. A. B. Charlton, 11 Chandoss treet, Cavendish Square, London W.; Vol. III., 1889.

Yorkshire Coach Horse Society. J. White, The Grange, Appleton Roebuck, Balton, Percy; Yorkshire Coach Horse Stud Book of Great Britain and Ireland, Vol. III., 1890.

Shetland Pony. George Bruce, 35 Market street, Aberdeen, Scotland; Shetland Pony Stud Book.

Societe des Eleveurs Belges, Liege, Belgium.

Societe National des Eleveurs Belges, Brussels, Belgium.

Societe Hippique Percheronne, Nogent le Rotron; Percheron Stud Book.

SWINE.

British Berkshire Society. Heber Humphrey, Shippon, Abington, England.

National Pig Breeders' Association. W. C. Young, 191 Fleet street, London, E. C.

CATTLE.

Shorthorn Society of Great Britain and Ireland. E. J. Powell, 12 Hanover Square, London W.; Coates' Herd Book, Vol. XXXVI., 1890.

Hereford Herd Book Society. S. W. Urwick, 20 East street, Hereford, England; Herd Book of Hereford Cattle, Vol. XXI., 1890.

Hereford Cattle Breeders' Association. J. O. Urwick, 20 East street, Hereford, England.

English Jersey Cattle Society. John Thornton, 7 Princes street, Hanover Square, London W.; Vol. III.

Devon Cattle Breeders' Society. John Risdon, Jr., Wivilscombe, Somerset, England; Davy's Devon Herd Book, Vol. XIII., 1890.

Red Polled Society of Great Britain and Ireland. Henry F. Euren, Mercury Office, Norwich, England; Red Polled Herd Book of Cattle descended from the Norfolk and Suffolk Red Polled, Vol. VII. 1890.

Sussex Herd Book Society. W. C. Young, 191 Fleet street, London, E. C.; Vol, V., 1890.

Galloway Cattle and Herd Book Society. Rev. John Gillespie, M. A., Monswald Manse, Ruthwell, R. S. O., Dumfrieshire, N. B., England; Vol. X., 1890.

Polled Cattle Society. Alexander Ramsay, 9 Old Market Place, Bauff, N. B., England; Vol. XIV., 1890.

Ayrshire Cattle and Herd Book Society. J. M'Murtrie, 70 Newmarket street, Ayr, N. B., England.

Highland Cattle Society of Scotland. Duncan Shaw, W. S. 42 High street, Inverness, England; Vol. IV., 1890.

Jersey Herd Book. Joshua Le Gros, La Prairie, St. Lawrence, Jersey, England; Vol. X.

North Wales Black Cattle Society. William Arthur Dew, Wellfield, Bangor Wales; Welch Black Cattle Herd Book.

English Guernsey Cattle Society. Julian Stephens, 19A Coleman street, London, E. C.; Vol. VI., 1890.

Kerry Herd Book. Registrar, Royal Dublin Society, Kildare street, Dublin, Ireland; Kerry and Dexter Herd Book, Vol. I., 1890.

La Commission du Herd Book Norman. G. Rivand President ex-officio, Le Prefet du Calvados, Caen, France.

Wesermarsch Herdebuck Vereius. Heinrich C. Tautzen. Kiddengen bei Rodenkirchen.

Het Freisch Rundvee Stambalk Verceniging. D. Van Konijuenburg, Lenwarden, Netherlands.

Schweizer ischen laudwerths chafflichen Vereins. Prof. Auderegg, Salothum: Herd Books for Simmenthaler and Brown Swiss.

SHEEP.

Shropshire Sheep Breeders' Association and Flock Book Society. Messrs. Lythall, Mansell, and Walters, College Hill, Shrewsbury, England.

Oxford Down Sheep Breeders' Association. R. Henry Rew, 26 Norfolk street, Strand, London, W. C.; Oxford Down Flock Book, Vol. II., 1890. (Cassell & Co.)

Suffolk Sheep Society. E. Prentice, Stowmarket, Suffolk, England. Editor, C. E. B. Davis, Kirtling, Newmarket, England.

Pure, Select Wensleydale Long Wool Sheep Breeders' Association. T. T. Willis, Manor House, Carperby Bedale, England.

Wensleydale Long Wool Sheep Breeders' Association. T. J. Other, Howgrave, Ripon, England; Vol. 1, 1890.

Hampshire Down Breeders' Association. J. E. Rawlence, Salisbury, England; Vol. I., 1890.

Record Associations of the United States.

CATTLE.

American Aberdeen Angus Breeders' Association. Secretary, Thomas McFarlane, Iowa City, Iowa.

American Branch Association of the North Holland Herd Book. Fred H. Beach, Dover, N. J.

American Devon Cattle Club. F. W. Reed, Zanesville, Ohio.

American Galloway Breeders' Association. L. P. Muir, Independence, Mo.

American Guernsey Cattle Club, Edward Norton, Farmington, Conn.

American Hereford Cattle Breeders' Association. C. R. Thomas, Independence, Mo.

American Jersey Cattle Club. F. W. Wicks, No. 1 Broadway, New York.

American Jersey Herd Book. O. B. Hadwen, Worcester, Massachusetts.

American Short Horn Breeders' Association. J. H. Pickrell, Chicago, Ill.

American Sussex Association. Overton Lea, Nashville. Tennessee.

Ayrshire Breeders' Association. C. M. Winslow, Brandon, Vt.

Brown Swiss Cattle Breeders' Association. N. S. Fish, Groton, Conn.

Dutch Belted Cattle Association. H. B. Richards, Easton, Pennsylvania.

Holstein-Friesian Association of America. Thomas B. Wales, Boston, Mass.

Holstein-Friesian Advanced Register. Superintendent, S. Hoxie, Yorkville, N. Y.

Maine State Jersey Herd Book. N. R. Pike, Winthrop, Maine.

Red Polled Cattle Club of America. J. McLain Smith, Dayton, Ohio.

American Polled Durham Breeders' Association. A. E. Burleigh, Mazon, Ill.

SHEEP.

American Cotswold Association. Secretary, George Harding, Waukesha, Wis.

American Leicester Breeders' Association. A. J. Temple, Cameron, Ill.

American Lincoln Breeders' Association. L. C. Graham, Cameron, Ill.

American Oxford Down Sheep Association. W. A. Shoper, Middleton, Ohio.

American Southdown Association. S. E. Prather, Springfield, Ill.

American Shropshire Registry Association. Mortemer Levering, Lafayette, Ind.

Hampshire Down Breeders' Association of America. John I. Gordon, Mercer, Pa.

American Rambouillet Sheep Breeders' Association. T. F. B. Sotham, Pontiac, Mich.

Black Top Spanish Merino Sheep Breeders' Association. W. G. Berry, Houstonville, Pa.

Delaine Merino Sheep Breeders' Association. J. G. McNary Houstonville, Pa.

Dickinson Merino Sheep Record Co. H. G. McDowell, Canton, Ohio.

Improved Black Top Merino Sheep Breeders' Association. L. M. Crothers, Taylorsville, Pa.

Improved Delaine Merino Sheep Breeders' Association. George W. Poland, Urbana, Ohio.

Michigan Merino Sheep Breeders' Association. E. N. Ball, Hamburg, Mich.

Missouri Merino Sheep Breeders' Association. H. V. Pugsley, Plattsburg, Mo.

National Improved Saxony Sheep Breeders' Association. John G. Clark, Toledo, Pa.

National Merino Sheep Breeders' Association. R. O. Logan, California, Mich.

New York State American Merino Sheep Breeders' Association. J. Horatio Earll, Skaneateles, N. Y.

Ohio Spanish Merino Sheep Breeders' Association. F. G. Stanley, Cardington, Ohio.

Pennsylvania and Ohio Improved Delaine Merino Sheep Breeders' Association. R. M. Cleaver, East Bethlehem, Pennsylvania.

Standard American Merino Register Association. John P. Ray, Hemlock Lake, New York.

U. S. Merino Sheep Breeders' Registry Association. A. E. Sprague, Brice, Ohio.

Vermont Atwood Club Register. George Hammond, Middlebury, Vt.

Vermont Merino Sheep Breeders' Association. Albert Chapman, Middlebury, Vt.

Wisconsin Sheep Breeders' and Wool Growers' Association Merino Sheep Register. H. J. Wilkinson, Whitewater, Wisconsin.

American Merino Sheep Register. A. H. Craig, Caldwell's Prairie, Wis.

HORSES.

American Association of Importers and Breeders of Belgian Draft Horses. Secretary, J. D. Connor, Wabash, Ind.

American Association of Jack and Jennet Breeders. W. H. Goodpasture, Nashville, Tenn.

American Cleveland Bay Breeders' Association. R. P. Stericker, Springfield, Ill.

American Clydesdale Association. Charles F. Mills, Springfield, Ill.

American Percheron Horse Breeders' Association. S. D. Thompson, Chicago, Ill.

American Shetland Pony Club. J. Murray Hoag, Maquoketa, Iowa.

American Shire Horse Breeders' Association. Charles Burgess, Wenona, Ill.

[*Continued on Page* 87.]

THE HORNELL SANITARIUM,

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Special attention is given to **CANCER.** Neither the knife nor caustics, nor poisons are used in this institution. The treatment is based upon the theory recently embodied in papers read by Prof. v. Mosetig Moorhof before the Royal and Imperial Association of Physicians of Vienna, namely: That as the cell-elements in cancer have much less vitality than those of sound flesh, it is possible to attack them without injuring surrounding healthy cells or the well being of the patient.

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Write to Dr. J. D. Mitchell, physician in charge, for particulars and references.

Champion Evaporator.

For MAPLE, SORGHUM, CIDER, AND FRUIT JELLIES.

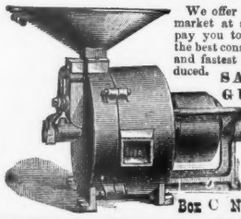
Corrugated pan over firebox, doubling boiling capacity. Small interchangeable syrup pans (connected by siphons), easily handled for cleansing and storing, and a **Perfect Automatic Regulator.** The *Champion* is as great an improvement over the Cook Pan as the latter was over the old iron kettle, hung on a fence rail.

Catalogues **Free.** *Mention this paper.*

The C. H. CRIMM MFG. CO.

Hudson, Ohio and Rutland, Vt.

Burr-Stone Grinding Mills



We offer you the best mill on the market at such a low figure it will pay you to write to us. They are the best constructed, least complicated and fastest grinding mills yet produced. **SATISFACTION GUARANTEED.** Send 2ct. stamp for our 48 page **Illustrated Catalogue.**

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THE SCIENTIFIC GRINDING MILL

BEST MILL on Earth.

SAVES 25 to 50 per ct. Grinding Feed. Reversible **Self-Sharpening Grinding Plates.** Send for illus. Catalogue C

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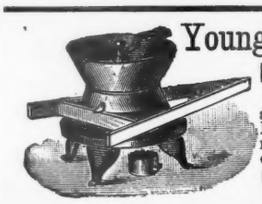

Grinds ear corn and other grain. Most durable Mill made. Send for catalogue.

Enterprise Mfg. Co. Columbiana, Ohio.

Record Associations of the United States.

[*Continued form Page* 86.]

American Stud Book (Thoroughbred). Editor, S. D. Bruce, New York.

American Trotting Register. Editor, Joseph H. Steiner, Rialto Building, Chicago, Ill.

French Coach Horse Society of America. S. D. Thompson, Chicago, Ill.

National French Draft Horse Association. C. E. Stubbs, Fairfield, Iowa.

Select Clydesdale Horse Society of America. J. B. McLaughlin, Topeka, Kansas.

American Suffolk Punch Horse Association. A. R. Galbraith, Janesville, Wis.

German Coach Horse Association of America. A. Oltmanns, Watseka, Ill.

The Morgan Register. Editor, Joseph Battell, Middlebury, Vermont.

SWINE.

American Berkshire Association. Secretary, John Springer, Springfield, Ill.

American Duroc-Jersey Swine Breeders' Association. S. E. Morton, Camden, Ohio.

American Essex Association. W. M. Riley, New Augusta, Indiana.

American Small Yorkshire Club. George W. Harris, New York.

Cheshire Swine Breeders' Association. G. S. Button, Chittenango, N. Y.

Chester White Record Association. W. H. Morris, Indianapolis, Ind.

Todd's Improved Chester White Record Association. Carl Freigau, Dayton, Ohio.

Gothland Swine Breeders' Association. Grant W. Spear, Aurora, Ill.

American Poland-China Record Co. John Gilmore, Vinton, Iowa.

Central Poland-China Swine Association. W. H. Morris, Indianapolis, Ind.

Northwestern Poland-China Swine Association. J. O. Young, Washington, Kan.

Ohio Poland-China Record Co. Carl Freigau, Dayton, Ohio.

Standard Poland-China Record Co. Ira K. Alderman, Maryville, Mo.

Victoria Swine Breeders' Association. H. Davis, Dyer, Indiana.

Winter.

Now is the time of the fiery steed and the sleigh, and of the pretty girl in her furs, and of the young man. Now he who is without a horse feels himself lost, and straightway hires one at the nearest livery. The pretty girl waits at the window for his arrival, and hails it with joy. Together, bundled in the buffaloes, they glide along under the stars to the music of the merry bells. He feels that there is nothing half so enjoyable as to speed swiftly behind a fast nag, with a pretty face nestling close to his sleeve. She is not indifferent to the charms of the situation, and makes no objection when he says, "Ah! there is Tom Green with his bay mare. Now see me do him up." They strike a 2:40 clip, and our young man is forging ahead, when his trotter slips and plunges to an alarming extent, and finally comes down to a wobbly walk. Tom stops, like a true sportsman, to see what is the trouble. "See there!" he cries; "he has cast a shoe." Our young man sees his evening's sport to an end, and sorrowfully turns homeward. The skies have lost their rosy hue. How cold it seems. Our young man's face is so long that he would strike his toe against it if he walked. The pretty girl shares his disappointment, and thinks "It is too bad." He swears inwardly, and vows that the liverymen will get no pay for the rig. Leaving the pretty girl at her domicile, he starts for the liveryman, with blood in his eye. "See here! What do you mean by giving me a horse that is in such poor shape that his shoe comes off in driving half a mile? This is the last horse I will hire of you," and he departs full of wrath. The next day our friend, the liveryman, meanders to his blacksmith in a far from cheerful frame of mind, and holds forth: "Jack! What kind of nails did you put on my horse's shoes with? Were they the Putnam, as usual?" "Well! to tell the truth, they were not. I have made it a practice to always use the Putnam nail, except in Winter, when I am sharpening so often that I think any cheap nail will hold for a few days." "Jack, you can now see that they will not. I have lost a good customer by your using this cheap trash, and I can tell you that you will lose one, also, if you do not come back again to your former nail. There is only one nail fit to use in a horse at any season of the year, and that is the hot forged Putnam. They are sure to hold the shoe, and cannot split or sliver in driving, as all other nails are liable to do. Jack, you cannot afford to save half a cent in shoeing a horse (which is all you could save by using the cheapest nail in the market) and run the risk of losing your reputation by having your shoes come off, or your money by disabling a horse with a split nail." Send to the Putnam Nail Company, Neponset, Mass., for samples, etc.

"**Moreton Farm.**"—A subscriber to the AMERICAN AGRICULTURIST recently wrote: "There is a mistake in the advertisement of the Joseph Harris Co. It should be Moreton Farm, Rochester, N. Y. The Rochester is left out." There is no mistake. If you will look in the Post Office Guide you will find that Moreton Farm is a post office itself, and it is no longer necessary to put on the Rochester. If you want Harris' Rural Annual for 1892, address Joseph Harris Co., Moreton Farm, Monroe Co., N. Y., and you will get it by return mail. There is but one Moreton Farm post office in the United States, while there are nineteen Rochesters. A letter to Moreton Farm will be sure to get there.

HORSES, SHEEP AND SWINE

HORSES —AT— **LAKESIDE STOCK FARM,**

SMITHS & POWELL, SYRACUSE, N. Y.

FRENCH COACH.—The evenest, best colored, finest bred of any importation yet.
TROTTING BRED HORSES.—Fine representatives of several of the most noted trotting strains, including descendants of "Electioneer," "George Wilkes," "Alcazar," "Whips," "Administrator," etc.
CLYDESDALES.—The largest and most noted stud in the Eastern States.
PERCHERONS.—A fine stock of the various ages.
Also the Celebrated Herd of **MILK AND BUTTER PRODUCING HOLSTEIN-FRIESIANS.**
BERKSHIRE AND CHESHIRE SWINE.
Separate Catalogues of HORSES and CATTLE sent on application. Mention this paper when writing

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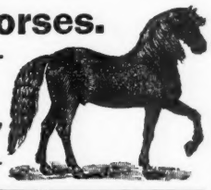

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—TO—
MORGAN HORSE CO.,
Dundee, Ill.
Mention AMERICAN AGRICULTURIST.

OXFORD DOWN SHEEP.

PURE BRED OXFORD DOWNS
are unsurpassed for **mutton and wool combined.** Known in England as "rent paying" and "general purpose" breed

TO OBTAIN PURE BRED
SHEEP, importers should buy only of breeders whose flocks are registered by the **Oxford Down Sheep Breeders' Association.**

FLOCK BOOKS
May be consulted at the office of this paper, or list of registered flocks obtained from the Secretary,
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OXFORD DOWN SHEEP.
GEORGE ADAMS, Royal Prize Farm Farmington, Berks, England.
Breeder of Pure Oxford Down Sheep. Shearling rams, ram lambs, shearling ewes and ewe lambs for sale on application. Special arrangements with foreign buyers. Flock has gained many first prizes at the Royal Agricultural and other shows in the past 20 years.

OXFORD DOWN SHEEP.
JOHN TREADWELL. Upper Winchendon, Aylesbury, England, having won prizes at the "Royal" show for **24 years in succession,** now retires from showing but will continue to hold his ANNUAL SALE of Oxford Down rams on first Wednesday in August. Ewes for sale at any time.

REGISTERED MERINO SHEEP.
Gentlemen's Driving and Family Horses.
C. A. CHAPMAN, Ferrisburgh, Vt.

OXFORD DOWN SHEEP.
BRYAN, JOHN & SON, Southleigh, Witney, Oxon.
One of the **oldest flocks in England.** 300 ewes. Annual sale by private contract of about 100 shearling rams. Also ewes for sale.

W. R. CRAIGHEAD & SON,
Breeders of **Short Horned Cattle,** National Delaine Merino Sheep and Berkshire Swine. Stock for sale.
R. R. Station, Greers;
Cannonsburg, P. O.,
Washington Co., Pa.

THE BRITISH BERKSHIRE SOCIETY.
PATRON: Her Majesty Queen Victoria.
PRESIDENT FOR THE YEAR 1891: H. R. H. the Duke of Connaught.
This Society is established to maintain the purity and improve the breed of BERKSHIRE SWINE in Great Britain and Ireland, and elsewhere excepting on the American continent.
Secretary, { **HEBER HUMFREY,** Shippon, Abingdon, Eng.

RECISTERED CHESHIRES.
Choice selections from stock combining large size, rapid growth and early fattening qualities. Prices low. Circulars free. **F. H. BRITT,** Ridgeway, Orleans Co., N. Y.

PIGS, *Jersey* **Calves;** *Rough-Coated* **Collies,** *English* **Beagles;** *Standard* **Fowls. Turkeys, Pekin Ducks, COLLIE PUPS** *cheap.* **57th** *year.* **F. MORRIS, Norway Pa.**

PIGS, Chesters, Berkshires, Polands, Fox Hounds, Beagles, Collies, Setters. **GEO. B. HICKMAN,** West Chester, Pa. Send stamp for Circular.

Hogs Duroc-Jerseys. Best prize stock for sale. *C. J. STUCKEY, Atlanta, Ills.* **Pigs**

STANFORD'S STOCK FARM, Ithaca, N. Y. Stallion colts, standard & non-standard, desirable stock at low prices. Write your wants.

National Dickinson Delaine
Mutton Merinos. **C. G. MEARS,** Gilbert, Musk Co., O.

LIGHT BRAHMAS. **Large standard birds. Can** suit the most particular.
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LIGHT BRAHMAS—White and Barred P. Rocks at a bargain for 30 days to reduce stock. Circulars free. **A. T. Owens,** Curwensville, Pa

DR. S. C. MOYER LANSDALE, PA., Breeder of B. P. Rocks, W. & S. Wyandottes, L. Brahmas and Anconas. CHOICE STOCK FOR SALE.

J. F. WATERS, SAVANNA, MO., breeder of Herford cattle. Stock of both sexes for sale. Prices reasonable.

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Largest Growers in the World
—OF—
ROSES FOR CUT FLOWERS.
Special attention given to mailing large or small orders for rose plants, especially the new varieties.
Rosebuds and all other cut flowers shipped to any part of the United States or Canada.
C. Strauss & Co., Washington, D. C.

40 GRAPE VINES better than **40 ACRES.** **$715 per year profit from 40 vines. Norwynden Gros Colman Grape Vines will yield $10 per vine per year. Neither experience or expense required. Vines $1 each; large orders and trade discount. ALFRED E. BAKER,** Norwynden Graperies, **W. Chester, Pa.**

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Mammoth Clover Seed
Of purest and best quality. Samples free. Write early.
THE WHITNEY-NOYES SEED CO.,
Specialists in High Grade Grass Seeds,
Binghamton, New York.

O, SAY! **Have you seen SMITH'S Small Fruit Farmer.** **O, SAY!**
It is a Quarterly Pamphlet of 24 pages, for 50 cents a year. It is pointed, practical, and helpful; a journal devoted especially to berry culture, markets, profits, etc.
Send 5 two-cent stamps for sample copy.
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Should cultivate a few plants of the **WONDERFUL-SNOWFLAKE DAISY.** It is perfectly hardy, will grow and bloom all winter in a cold frame (if covered cold nights), is pure white, beautifully quilled, double to the center. Very neat and chaste, as large as a 50 cent piece. Six strong plants for 60 cents. 12 for $1. 50 for $3. 100 for $5. Free by mail. Please mention this paper.
J. C. GIBSON, Woodbury, N. J.

GOLDEN RULE NURSERY, Hartford City, Ind. Choice trees and plants. Honest Prices.

Note and Comment.

Fertilizers and Insecticides.—W. S. Powell & Co., Baltimore, Md., chemical fertilizer manufacturers, issue a neat and interesting pamphlet on the A B C of Agriculture. The various chapters are well written, treating on the general principles of agriculture, the use of fertilizers, fungicides, specialties in farming, garden work by months, and other subjects of interest to farmers and gardeners. By referring to the advertisement in another page of this number, it will be seen that this publication may be obtained free by applying to the firm.

Best Tea and Coffee Within Reach of All.—The Great American Tea Company, whose advertisement appears in another page of this number, has achieved unparalleled success in the tea and coffee trade, having effectually broken up the high prices of these articles and brought them within the reach of all. Their maxim of furnishing only the best and purest articles at the lowest possible price, has introduced their teas and coffees throughout the country, and those who have once used their goods will rarely be satisfied with anything inferior. No one will regret having given their goods a trial.

Fifty Years of Machinery Manufacture.—A. W. Stevens & Son, Auburn, N. Y., are among the oldest manufacturers of threshing machinery in this country, having been in the business since 1842. They are also manufacturers and dealers in threshing engines, Buhr stone mills, cultivators, tooth harrows, haying implements, etc. The increasing business of this firm has made it necessary to establish a branch house in Chicago. They have also numerous branch houses distributed throughout the Union, where their deservedly renowned manufactures may be obtained. Catalogues will be mailed free to applicants.

Purity in Cocoa.—It appears from analyses made by English and German chemists that the cocoas made by the Dutch process contain a considerable percentage of alkalies and other chemicals, which are introduced for the purpose of giving apparent smoothness and strength to the decoction. The use of chemicals can be readily detected by the peculiar odor from newly-opened packages, and also from a glass of water in which a small quantity of chemically treated cocoa has been placed and allowed to remain for several days. For more than one hundred years the house of Walter Baker & Co. have made their cocoa preparations absolutely pure, using no patent process, alkalies, or dyes.

Results from the Late Paris Exposition.—The Whitman Agricultural Co., St. Louis, Mo., which, as was stated in a former number of the AMERICAN AGRICULTURIST, was awarded the grand gold medal and a special grand prize object of art at the late Paris Exposition and field trials in competition with the world, are just in receipt of the following letter from their Paris agents: "The War Department have just finished a trial of baling presses, which was a complete success for you. All other competitors have been ordered to remove their presses from the grounds. The presiding officer advises us that your press worked to their entire satisfaction, and that orders would be placed for quite a large number."

A Valuable Article of Diet.—The inventor of pure and easily-digested cocoa in powdered form, was Mr. C. J. Van Houten, of Holland; and his process of manufacture is still used by the firm of Van Houten & Zoon, Weesp, Holland. This process has never been excelled in rendering the cocoa easy of assimilation and, at the same time, in bringing out to the full its nourishing qualities. The special value of this cocoa, is that the Van Houten's patent process of manufacture increases the solubility of the flesh-forming elements fifty per cent., and thereby disentangles, brings out and liberates the flavor and aroma in such a way as to produce a superb beverage, which is certified to by medical authorities all over the world.

Farm Drainage.—The subject of farm drainage is becoming of greater importance from year to year, as will be seen by articles on this subject published in recent numbers of the AMERICAN AGRICULTURIST. One of the most important conditions for successful land drainage is to use the best kind of tile. Having ourselves used considerable quantities of the drain tile manufactured by Jackson Bros., Albany, N. Y., we know of what we speak when we recommend those who are in want of first-class drain tile to send to Jackson Bros. for their catalogue and price-list before ordering elsewhere. This firm manufactures not only ordinary brick tile in all the various forms used, but are also wholesale agents for the Standard Akron Salt Glazed Sewer Pipe, also Portland & Rosendale Cement Fire-Brick and Kaolin.

The Situation in England.—M. P. Squirrell, a prominent grain merchant, Norwich, England, writes considering the prospects for agriculture as stated by C. Wood Davis: "We, here in England, are living in a fool's paradise, or over a vocano. The public are utterly oblivious of the thin place they are on. The United States of America have been and still are looked on as an inexhaustible bottle. The old saying that the Mississippi Valley could feed the world is still credited. For some time

(*Continued to Page* 90.)

DO YOU SHOOT?

IF SO YOU SHOULD KNOW OF THE WONDERFUL IMPROVEMENTS MADE IN ... THE FAMOUS ...

STEVENS' RIFLES have done what the shooting world claimed was impossible.

STEVENS' PISTOLS have eclipsed all previous records with pistol.

We publish a special circular and catalogue detailing latest triumphs in fire-arms. Sent free to any part of the world on application.

J. STEVENS ARMS and TOOL CO.,
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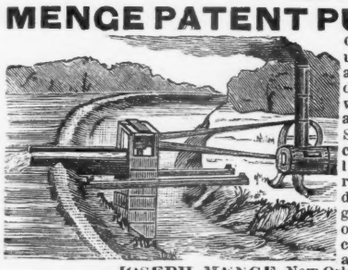

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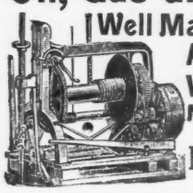
Oil, Gas and Artesian Well Making Machinery And Tools.



WATER WELL Machinery & Supplies
Catalogue Free.
Brass & Iron Works Co.
FOSTORIA, OHIO.

Mr. Alexander says 'O. K.'

The BUCK-THORN FENCE I built last summer has been greatly admired; many farmers consider it the best Barb Fence in the country.

I think you will have considerable call for it in this vicinity the coming season; people consider it just the thing, if it will stand the winter. I strained mine pretty tight, and many thought it would be liable to break when cold weather set in, but we have had the coldest winter ever known here, and the fence is "O. K."—not a single break. I used it to inclose a horse pasture, and it gives perfect satisfaction.
T. H. ALEXANDER, Mason City, Iowa.

If BUCK-THORN is not sold in your town we will ship it to you from the mill, *all freight paid*. Samples and descriptive circulars by mail. Write to THE BUCK-THORN FENCE CO., Trenton, N. J.

PILES CURED FREE. New, Painless, Certain. Gives instant relief and lasting cure—never returns. To prove it we will send a trial package **FREE**, to any address. PYRAMID DRUG COMPANY, Box 35, ALBION, MICHIGAN.

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This is the time for Receptions, Weddings, and anniversary festivities which call for Evening Dress. Good Taste and Fashion require for such events the use of Silk Fabrics.

Our Stock includes every known style of these goods, from the lightest Gauze to the wide Silk of heaviest Cord.

We shall be glad to answer any inquiry regarding prices and styles, and to send samples whenever the desired fabric is definitely stated.

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Fur Neck Boas.

Mink, with head and tail, $5, $7 $10, and $15 for the very best. Hudson Bay Sable Boas, $15, $25, $30, and $35 for the best. Persian Lamb, $5, $7 and $9. Gray Krimmer, $5. Also Boas of other Furs. $2.50, $3, $4, $5 and $6. Muffs to match, at correspondingly low prices. Large stock of Sealskin Garments, and all Fashionable Furs of every description.
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Our Fat Babies' Dongola Hand Sewed Button Boot, sizes 1 to 5, 40 cents.
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All postage paid by us. Mention this paper.
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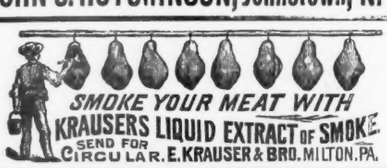
149 CONGRESS ST., BOSTON, MASS.

About Gloves. When buying gloves, remember that Hutchinson's are the best. If your dealer does not have them, send stamp for the book "About Gloves." It will interest you.

JOHN C. HUTCHINSON, Johnstown, N. Y.



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THE HERALD OF HEALTH FOR 1892.

October, November and December Numbers Free to those who send at once. The Scientific American says, "It contains more sensible articles than any magazine that comes to our sanctum":—

THE OCTOBER NO. CONTAINS:

1. How to Purify Our Water.
2. Climate for Consumptives.
3. Effects of Moderate Drinking.
4. Queen Victoria's Gardens. Curing by Faith, and many other articles.

THE NOVEMBER NO. CONTAINS:

1. Enlarging and Strengthening the Chest.
2. The Failure of the Heart.
3. Perfect Health to Prevent Colds.
4. Remedy for Bronchitis. Baths for the Old.
5. Alcohol as a Medicine. Drinkers' Children. Going to Sea for Health. The Perfect Man, and many other papers.

THE DECEMBER NO. CONTAINS:

1. Rules for Promoting Long Life.
2. Habits of Gladstone, Tennyson, etc.
3. Is a Perfect Man Possible.
4. Excessive Physical Culture.
5. Best Climate for Consumptives.

The January No. will be one of the best, and alone worth a year's subscription. It will contain a splendid paper entitled:

AN EXPERIMENT IN HUMAN STEIPICULTURE.

C. M. Depew on Tobacco.
Errors Concerning the Use of Alcohol.
Perfection in Man. Healing by Prayer.
Cure of Corns. Temperature for Baths.
Physical Culture in Schools.
Health in the Home, etc. Vices of the Old.
Removing Moles from the Face.
Causes which Produce Insanity Classified.
What Men of the Future Will Do. Over-Worked Children.
Digestive Powers of Donkeys and Mules.
Meat Diet and Health.
Leprosy Spread by Vaccination.
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The notes concerning health in every number worth the price.

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LADY AUDLEY'S SECRET, By Miss M. E. Braddon.
VANITY FAIR, By W. M. Thackeray.
THE LAST DAYS OF POMPEII, By Sir E. Bulwer Lytton.
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PUT YOURSELF IN HIS PLACE, By Charles Reade.

They are printed from new type, clear, bold and readable, upon paper of excellent quality. Altogether it is a delightful set of books, and we are most happy to be enabled to afford our subscribers an opportunity of obtaining such splendid books upon such terms as we can give.

CLUBBING RATES.—The Herald and Scribner's, $3.50; with Harper's Monthly, $4; Harper's Weekly or Bazar, $4.25; The Century, $4.50; Any $1.50 Journal, $2.

Success in life depends largely on remembering

HOW TO STRENGTHEN THE MEMORY.

Titles of Chapters: **By M. L. HOLBROOK, M. D.**

1.—Introductory. The Nature of Memory.
2.—The Best Foundation for a Good Memory.
3.—Memory and Nutrition; Memory and Fatigue; Memory and the Circulation of the Blood; Quality of the Blood; Memory and Disease; Memory and Narcotics.
4. Exaltation and Degeneration of the Memory.
5.—Memory and Attention.
6.—Memory and Repetition.
7.—Memory and Associations, Links and Chains.
8.—A Striking Example of Restoration of the Memory, and the Methods Employed.
9.—Methods of Memory Culture for Schools.
10.—Self-culture of the Memory.
11.—Memory for Names and Its Culture.
12.—Memory for Faces and Its Improvement.
13.—Memory for Places and Localities.
14.—Culture of the Musical Memory.
15.—Strengthening the Memory for Facts and Events.
16.—Memory for Figures and Dates.
17.—The Figure Alphabet.
18.—Tricks of Memory.
19.—How to Learn a New Language, or the Surest and Most Effectual Way to Ensure an Easy and Accurate Reproduction of Ideas.
20.—Culture of a Memory for Words.
21.—Advice to Clergymen concerning their Memories.
22.—The Lawyer's Memory.
23.—Mastering the Contents of a Book.
24.—The Art of Forgetting and what to Forget.
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The price of this book ought to be $2, but we set out to give it an immense sale and have put the price at $1, which is very cheap since it is acknowledged to be the best book on the subject. If you won't take our word for this, read the following:

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These reserved lands lie along the eastern or Atlantic coast, between St. Augustine and Biscayne Bay, one-half mile to six miles from the ocean, a large portion being far below the frost limits.

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Improved transportation facilities, delightful climate (being so near the ocean the air is much more bracing than farther inland) makes this an excellent opportunity for actual settlers.

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FOR SALE 300 cheap **FARMS** in the near South. Circulars **FREE. J. H. BRISTOR,** Martinsburg, W. Va.

Note and Comment.

(*Continued from Page* 88.)

I have thought that a rude awakening is not far off, and Mr. Davis's able epitome [published in this number] comes in more than confirmation of my opinion." The way in which Beerbohm, the English buyers' authority, attempts to mislead the market is shown by his late estimate of the world's wheat crop of 1891 as *larger* than that of last year! His figures are completely demolished by Mr. Davis's criticisms in the Chicago *Post* of December 4th, which are backed up by citations of reliable authorities.

A Useful Household Article.—The Enterprise meat chopper, advertised in this number, is especially adapted to family use, and is not excelled for chopping sausage and mince-meat, lobster, Hamburg steak for dyspeptics, codfish, suet, hog's-head cheese, tripe, scrap meat for poultry, corn for fritters, scrappel, stale bread for bread crumbs, peppers, horse-radish, cocoanut, vanilla beans, cabbage, etc. It is indispensable, too, in making beef tea for invalids, pulverizing crackers, mashing potatoes, preparing chicken salad, chicken croquettes and hash; and the appreciative and economical housewife will find so many points of merit in this labor and time saving article, as to find time to wonder how she ever got along without it. For fuller information, we would advise our readers to send to the Enterprise Manufacturing Co., Third and Dauphin streets, Philadelphia, for one of their illustrated catalogues, which are cheerfully furnished upon application.

The Wheat Market has been heavy, and domestic prices a bit weak during December, because exports to Europe have been more than she could instantly consume. But allowing the United States crop to be 600,000,000 bushels, our 63,872,250 people must have (at 5.7 bushels *per capita*) 365,000,000 bushels, leaving a possible 235,000,000 bushels for export. Now, in the twenty-two weeks ended Dec. 5, there was exported from Atlantic ports 83,714,805, and from Pacific ports 18,938,985 bushels, or a total of 102,651,000 bushels, leaving of the surplus only 132,346,000 bushels as available for export during the ensuing thirty weeks of the crop year. Pacific Coast exports have been so small as to indicate that her surplus has been much exaggerated, and what was left of it Dec. 5 could not be over 20,000,000

(*Continued to Page* 91.)

WHAT THEY SAY!

WAGNER—The tone of the **Estey Organ** is very beautiful and noble.

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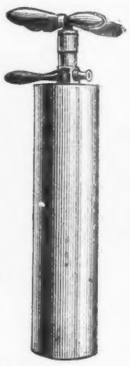

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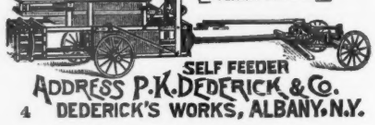

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Note and Comment.

(*Continued from Page* 90.)

bushels. This would leave 112,346,000 bushels as the Atlantic coast surplus at that date. Now Europe's requirements (averaging the estimates of C. Wood Davis, Dornbusch and Beerbohm) are 422,000,000 bushels, or 8,115,000 bushels per week. Counselman & Day, heavy receivers of actual grain at Chicago, estimate the weekly shipments from Pacific coast at a possible 660,000 bushels, India 400,000 (liberal, as she had exported 41,000,000 bushels prior to Dec. 1), Turkey and Danubian countries 300,000, Australasia and South America, 200,000, total 1,766,000 bushels per week. Deducting this from the estimated English requirements of 7,846,000 bushels weekly, makes the probable demand upon our Atlantic Seaboard 6,080,000 bushels per week, or 182,400,000 for the thirty weeks from Dec. 5. This makes a shortage of 70,054,000 bushels. Without reference to the enormous rye shortage, the possibility of Russia being an importer, nor the poor condition of crops, all of which may well offset under-consumption, "the winter and spring must be unusually auspicious for crops or very high prices must prevail."

Animal Food for Hens.—The food generally fed to fowls in confinement does not contain the elements that go to make eggs. To produce them in large quantities, the hen should be fed on meat, or its equivalent. "Animal Meal," manufactured by the Bowker company of Boston, is a meat and bone ration, and has come into such demand among poultry keepers who know its value, that it is sold by dealers generally throughout the country. It occasionally happens, however, that some dealers do not keep it, and when this is the case, the poultry man should be careful to accept no substitutes, but either send to headquarters for his supply, or insist upon his dealer doing so for him. The company sends trial bags containing enough for ten hens three months for one dollar, or four times as much for $2.25, delivered by freight to any station in the New England or Middle States. All freight charges prepaid by the company.

The Hop Census makes the following exhibit (the figures for 1891 being those of the New England *Homestead*), 000's being omitted in pounds and values:

	N. Y.	*Wash.*	*Cal.*	*Ore.*	*Wis.*	*Total.*
Acres in						
1889	36,670	5,113	3,974	3,130	967	50,212
1890	35,552	5,282	3,796	3,223	871	48,962
1891	36,301	5,791	4,750	3,810	944	51,954
Pounds in						
1889	20,063	8,313	6,547	3,614	429	39,171
1890	17,861	8,883	5,717	3,811	460	36,873
1891	20,510	10,134	7,600	4,763	189	43,796
1879	21,629	703	1,444	244	1,967	26,546
1869	17,559	6	625	10	4,630	25,457
1859	9,672	.....	.....	.....	136	10,992
1849	2,536	.....	.....	.....	16	3,497
Value in '91	$ 2,210	841	606	323	52	4,060
1890	$ 6,068	2,285	1,522	1,047	142	11,105
1891	$3,487	1,469	1.140	738	19	7,165
Yield p acr.						
1889	547	1,626	1.648	1.155	443	*av.* 780
1890	502	1,682	1,507	1,183	528	753
1891	650	1,750	1,600	1,250	200	843
Value p lb.						*av*
1889	11.0c	10.1c	9.3c	9.9c	12.1c	10.3c
1890	33.9c	25.7c	26.6c	27.5c	30.9c	30.1c
1891	17.0c	14.5c	15.0c	15.5c	10.0c	16.4c

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Guaranteed NOT to Peel, Break or Stick. to Leak at the Seams.

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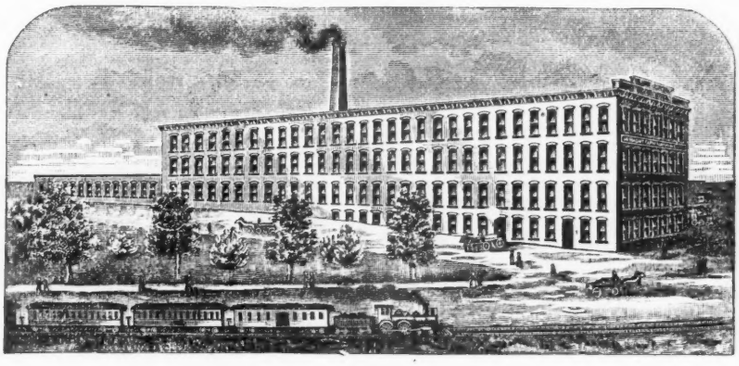
Railroad Puzzle. Pat. app'd for. Latest and best. Pass two trains on single track. Sample by mail 15c. B. O. TITUS, 514 Benson street, Camden, N. J. Agents wanted.

Largest Dairy Supply House in the United States.



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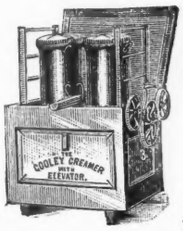

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The SEPARATION of the CREAM from the milk is so thorough that analyses of skim milk show less than 1-20th of 1 per cent of fat left therein; being the most perfect separation known. They have AUTOMATIC SKIMMERS in the ELEVATOR style, and Automatic Ball Float Skimmers and the Surface Skimmers in the Cabinet Style.

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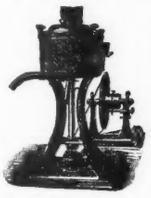

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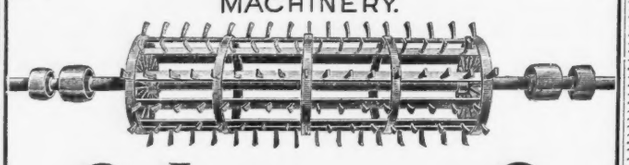

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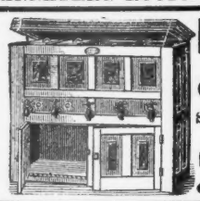

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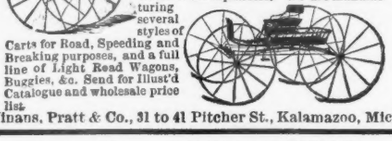

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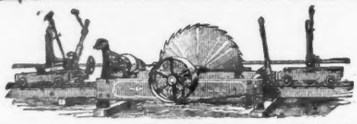

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To Remedy Speculation in Futures.

"A bill defining options in futures and imposing special taxes on dealers therein, and for other purposes," has been introduced into the Senate of the United States by Mr Washburne and in the House by Representative W. H. Hatch. It defines "options" as meaning any contract whereby a party acquires the right or privilege, but is not thereby obligated, to deliver to another at a future time or period, wheat, corn, oats, barley, rye, cotton, and all other farm products, also pork, lard, beef, and all other meat products. "Futures" is defined to mean any agreement whereby a party contracts to sell and deliver at a future time any of these articles, when at the time of making such contract the maker is not the owner of the article to be delivered. It is provided that this shall not apply to contracts for the future delivery of such articles to the United States or to any State, county or municipality. Neither is the proposed law to apply to any farmer's contract for the sale and delivery at a future of such articles, which are in actual course of production, on land owned or occupied by such farmer at the time of making the contract.

The bill compels every dealer in options or futures to take out an internal revenue license at a fee of $1,000 a year, and to pay a tax of five cents per pound for each and every pound of cotton or of pork, beef, or other meat products, and the sum of twenty cents per bushel for each and every bushel of the other articles mentioned. Any options or futures contract shall be absolutely void, unless the makers thereto comply with the law. The bill provides for returns of all such transactions to the Commissioner of Internal Revenue, and penalties of not less than $1,000 or more than $5,000 with or without imprisonment of not less than thirty days or more than six months. The bill further provides that such license certificate shall not exempt any one from the laws any States may make regulating dealings in options or futures, nor shall the payment of the internal revenue taxes be held to prohibit any State or municipality from placing a tax or duty on the same transactions for such municipal and other purposes.

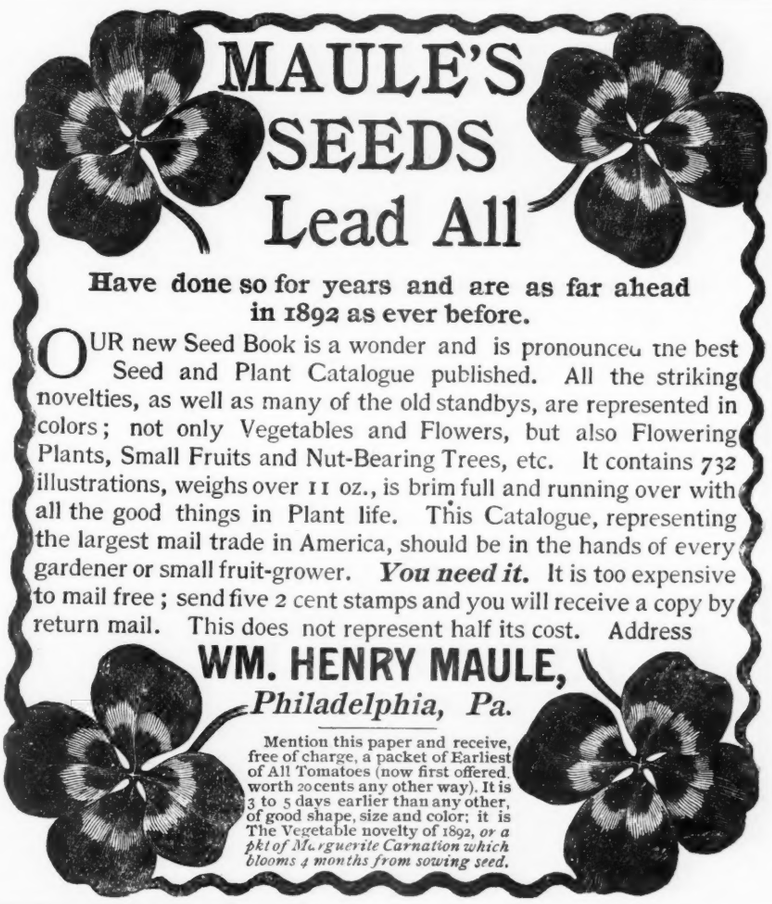
The effect of the measure, if enacted into law, would be to tax such speculation out of existence. It is substantially the same measure that attracted much attention in the last Congress, under the name of the "Buttterworth bill."

The way in which such speculation injures the farmer best appears by explaining just how the traffic is conducted. Suppose that in August, when wheat sold at $1.12 per bushel in Chicago, "A" offered to sell "B" 5000 bushels of wheat at ninety-five cents, to be delivered any day in December that B preferred; that is, B would have the option or right to call for the wheat on any day between Dec. 1st and 31st. Suppose that wheat is selling at ninety-six cents on Dec. 5th, and B fears it will go lower. He therefore closes the trade by calling on A, not for 5,000 bushels of wheat, but for the one cent per bushel, or $50 in all, that the price has advanced over the figure he paid for the option in August. On the other hand, had B held off until Dec. 16th, when wheat sold at ninety cents, and then closed the trade, fearful of another decline, he would be obliged to pay A the loss of five cents per bushel, or $250 in all, rather than take the wheat which he doesn't want. Hence A's object, since he sold himself short, has been to depress the market and bear values so that the price would go below ninety-five cents, and thus compel B to pay A the difference in price, which is A's profit on the gambling operation. It is easier to depress than advance prices, and as the only capital required is a margin to the amount of five cents per bushel, thousands of men gamble or speculate who don't produce or ever own a bushel of grain, but whose effort is constantly to force down prices.

A Reader for Fifty Years. — The December AMERICAN AGRICULTURIST completes its two score and ten years of existence, and perhaps the only complete file of this remarkable agricultural paper in the United States was in my possession (sometime ago two of the earlier volumes were taken to complete the file of the publishers). This old veteran, with its headline quotation from Washington—"Agriculture is the most healthful, most useful and most noble employment of man," has been a most welcome visitor in our household during this period. What important changes have taken place with this journal, will be told by the Editor, but still greater changes have taken place on the farms, and in the firesides in the rural districts. The AMERICAN AGRICULTURIST has always been faithful and true to the interests of the people engaged in agriculture, and has done its full share to give a higher caste to farming; and latterly by its high premiums in cash has shown that by improved methods in culture we can oversupply the home markets by hundreds of millions of bushels of the cereals. And now we sincerely hope, and know, it will use all its best efforts to secure "foreign markets, where we can exchange our surplus of things we do not need, for other things we cannot profitably produce at home." The series of papers by prominent men on the "Issues of the Day," were worth many times over the cost of a year's subscription to every farmer who read and properly digested them. Then the series of papers, (by that very interesting writer, Frank G. Carpenter), on agriculture in foreign countries, with its fine illustrations, were worth alone many times the cost. I hope the AMERICAN AGRICULTURIST may live to round out a full century. Its present efficient and practical editors may drop out by the way, this subscriber will have passed beyond, but many will live to see the AMERICAN AGRICULTURIST keeping its high standard and its present headline in 1941.

DAVID C. VOORHEES,
Maplewood Farm, Blawenburgh, N. J.

The Food Supply of the World.—C. Wood Davis, of Goddard, Kan., has reprinted in pamphlet form (price twenty-five cents), his various articles on this subject from the *Forum*, *Arena* and other periodicals. It contains articles on food and production; the exhaustion of arable lands; some impending changes; the farmer in the coming change; an epitome of the agricultural situation; some surplus producing States; an open letter; the market wrecking short-seller (a menace); the farmer, the investor and the railway; should the nation own the railways; the (Chicago) economist's opinion of short-selling; market wreckers prevent an advance in values; some phases of short-selling; opinions, professional and other, of market wrecking; the value of a trade journal's data.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Mention this paper and receive, free of charge, a packet of Earliest of All Tomatoes (now first offered, worth 20 cents any other way). It is 3 to 5 days earlier than any other, of good shape, size and color; it is The Vegetable novelty of 1892, or a pkt of Marguerite Carnation which blooms 4 months from sowing seed.

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AMERICAN AGRICULTURIST
FOUNDED IN 1842

JANUARY, 1892.

A Monstrous Wrong—Its Remedy.

Of all the economic evils that filch money from our farmers and retard their prosperity, none is more widespead and disastrous than the speculation in "futures." We make this statement advisedly, with due deliberation, and only after long observation and patient inquiry. This journal is too conservative to speak lightly on so grave a matter. But the enormity of the wrong done to the farmers of America by the "bear" speculation of the past three months, and which still continues, leads the AMERICAN AGRICULTURIST to devote its energies to uprooting and abolishing this gigantic robbery.

It is not too much to say that this speculation in fictitious articles has depressed prices of our four great staples at least ten per cent. in recent years. This lottery business has increased even faster than agricultural prosperity has decreased. Now that world-wide natural conditions promise to restore good times to the American farmer, the speculators have combined to postpone the improvement in values by artificially depressing prices in every conceivable way. But even though this most stupendous "bear" movement in the world's history is conducted by the legalized species of robbery sanctioned on the Board of Trade, it will fail of complete success. Its purpose is to keep down prices, and yet excite producers to sell for fear of still lower values, until the crops are all in dealers' hands. Fortunately, the inability of the railroads to haul the grain is preventing this sacrifice, and giving more time for farmers to learn the anomalous situation of the existing supply of food staples throughout the world.

The nefarious practices of the short seller have, this season, artificially depressed prices of the grain and cotton staples much more than ten per cent. Even allowing for the improvement in prices that the next few months seem destined to witness, it is not an exaggeration to say that the value of these staples, produced in 1891, will average ten per cent. less than would have been the case under a legitimate system of trade. Stated roughly in round numbers, this means that our farmers will, on their 1891 crops, be robbed on—

Cotton of 1c. per pound, or	$ 40,000,000
Oats of 3c. per bushel, or	20,000,000
Wheat of 10c. per bushel, or	60,000,000
Corn of 5c. per bushel, or	80,000,000
Total loss on four crops	$200,000,000

Why should these farm staples and hog products be subjected to this vicious tax? No other crop or product is sold by such a system. Wall street speculation in stocks is honest in comparison, for it is done on a cash basis, and the collaterals are actually delivered. In fact, it was dealing in futures on stocks that hastened the great panic of 1873. Even Wall street learned a lesson then that she has since profited by. Shall we wait for a similar demoralization in the commerce of food products?

Never. Dealing in futures and options must cease. It can be reached by the taxing power of government, as the bill now before Congress (see digest of same on Page 93) provides. That measure should be critically examined, its minor details perfected if weak or unjust and then enacted into law. The AMERICAN AGRICULTURIST invites the utmost scrutiny of its position in this matter, confident that both producers and consumers, and also the great mass of reputable merchants and middlemen, will find it to their interest to bring every possible influence to bear upon Congress in behalf of the speedy passage of the bill to tax dealing in "futures."

Of course the entire army of speculators, short sellers, bucket-shop dealers, and other barnacles on legitimate trade, will fight this measure to the bitter end. Every influence, that they know so well how to work, will be employed to distort the real issue and the facts it involves. Great effort will be made

JAMES RICHARD DODGE.

to delay the progress of the bill in Congress until the spring season, when it is hoped that farmers will be too busy to attend to it, and the bill can be quietly shelved. The way to compel the success of this measure is for every one to at once write a letter to his Representative, and to both the Senators from his State, strongly urging the immediate enactment of this bill. If every reader would write such a letter, and also induce all his acquaintances to do the same, it would make more votes for the measure than is possible in any other way. This is the simplest and most effective method of work.

Impressed with the magnitude of the task of reforming this evil, the AMERICAN AGRICULTURIST departs from its heretofore invariable rule, and heartily enlists in the direct work of this campaign. It will send, free to all applicants, a circular containing a copy of the bill in full, suggestions for letters in behalf of the measure, and petitions demanding its enactment, that are to be signed by taxpayers and producers every where. Our readers are not only invited to send for and circulate these petitions, but will help the cause by giving the addresses of others who may do likewise. It is only necessary to write a postal card to "The AMERICAN AGRICULTURIST, New York," asking for the outfit to remedy speculation in futures.

Past, Present and Future.

No word is here needed to supplement the remarkable insight into the past of American agriculture and of this journal, which appears in the foregoing pages. Nor is it necessary to speak of the course of the AMERICAN AGRICULTURIST in future, further than to say that its publishers are better equipped than at any time in its history to maintain its pre-eminence at the head of the agricultural press of the world.

But a word is in order concerning the present status and future prospects of the business of farming in America. First, it is well to caution the reader against accepting too literally Mr. Davis's interpretation of the present and prospective condition of the world's food supply. There are yet areas of no small magnitude where wheat can be grown on a considerable scale by the simplest methods of culture, while the productive power of the present cultivated area and of the vast arid region susceptible of irrigation, is not to be considered as having reached the maximum. Indeed, both area, and productive power are largely gauged by the price of staple crops, the farmer extending his area and improving his culture, and therefore increasing the yield, when the market situation warrants.

Hence, while the future is full of promise, it will be constantly more and more necessary to pay increasing attention to reducing the cost of production. The tendency in every industry is to produce at less cost, and there is no reason to believe that the future will see a change in this respect. On the other hand, there has been a constantly widening gap between the producer and the consumer, so that the middleman and speculator has received an increased part of the value of the farmers' product. This must be corrected. Whatever the future may have in store, whether it be a return to prosperous prices for wheat, or a continuance of moderate values, the profits on the average farm will depend upon the extent to which farmers coöperate in reducing expenses. Cheapness of production is important, but economy in buying and selling is equally, if not more important.

Landmarks of Progress.

When the AMERICAN AGRICULTURIST was founded, farming, as a business, was generally believed to require less knowledge and ability than any other calling. To make it more popular, attractive, and profitable, and, in the words of the founder of this magazine, "To enlarge the boundary of that high intelligence which we know the pursuits of an enlightened system of husbandry required," prompted the establishment of the AMERICAN AGRICULTURIST. The development of progressive agriculture had its beginning at that time, and forms one of the early landmarks in the history of American agriculture.

During the first years of this periodical, the principal means of improvement consisted in giving accounts of foreign farming methods, improved live stock, and new varieties of farm and garden crops. Gradually original research followed, and workers, as well as experimenters in this field, became more numerous. The successive steps in this direction were fully recorded in the former volumes of this journal, so that now, when one glances over these pages, he becomes impressed that an account of the history of the AMERICAN AGRICULTURIST is almost equivalent to that of American agriculture.

It would be useless to attempt to even enumerate the many important questions

which presented themselves to the editors and investigators. The subject of drainage was one of utmost importance. A knowledge of commercial fertilizers was made a special feature from its earliest days. Improved methods of bee-keeping were introduced, and Mr. M. Quinby's bee notes have instructed thousands of farmers in the art of bee-keeping. Small fruit culture received a powerful stimulus through the weekly exhibitions held for many years in the office of the AMERICAN AGRICULTURIST.

The collection of special crop reports was first instituted by this journal long before it was taken up by State or Federal government. The Timothy Bunker Papers, Joseph Harris' Walks and Talks, Peter Henderson's articles on market gardening, Dr. Asa Gray's articles on insect and plant fertilization, George Waring's Ogden Farm Papers, The Notes from the Pines, and the Doctor's Talks formed, each one of them, a landmark in the progress of agriculture. The German edition, published for thirty years, had a most beneficial influence upon the large German immigration of those years. In 1875, Prof. W. O. Atwater commenced a series of popular articles on science applied to farming, in which he explains the working of the German experiment stations and the benefit derived by farmers in experimentation with fertilizers, different foods and rations for domestic animals, and systematic methods in all farming operations. The desire was to still further demonstrate the teachings of science, and a number of farm experiments were instituted by the AMERICAN AGRICULTURIST in 1878-79-80. These were planned in a manner so simple and inexpensive that every farmer could understand and carry them out. Hundreds availed themselves of the facilities thus offered, and thereby became independent experimenters. Invaluable as were these experiments for the direct lessons taught by them, their indirect benefits were still greater. They stimulated thought and prepared the way for more extended investigation; they removed prejudice and distrust in scientific agriculture. The dawn of this era of independent and self-reliant experimentation, which finally resulted in the establishment of our magnificent system of national experiment stations, shines forth as one of the most radiant events in the history of American agriculture.

In exact line with these fertilizer experiments are the more recent crop competitions instituted by the present management of the AMERICAN AGRICULTURIST. While the former experiments determined the value of commercial fertilizers, the latter showed how they could be used most profitably and produce maximum crops. The fact that a thousand bushels of potatoes and two hundred and fifty bushels of shelled corn had actually been raised on one acre of ground gave an impetus to thousands of farmers throughout the land, who had never before dreamed of such possibilities. By thus stimulating better farming, and by its inquiry into the causes of agricultural depression and its impartial presentation of the leading issues of the day affecting agriculture, the AMERICAN AGRICULTURIST has again proved a beacon light to lead its readers into the brighter era of prosperity that now dawns so auspiciously. This is the landmark that characterizes the beginning of our second half century.

Quite as marked has been the progress of household economy and domestic life. The coöperative cheese factory and creamery, the modern methods of working up animal products, the sewing and washing machines, and other inventions for lightening woman's work, have robbed the farm home of much of its drudgery. The modern farmer's family also enjoys the advantages of musical instruments, literature, and other amenities of life which were a stranger to the average homestead of fifty years ago.

THE UNITED STATES DEPARTMENT OF AGRICULTURE.
View of the Main Building at Washington, D. C.

The Department of Agriculture.

This institution has come to occupy a position creditable alike to itself and to our country's greatest industry. Its elevation to the dignity of an executive department has been an important factor in the recent legislation and diplomacy whereby foreign markets for American farm products have been greatly enlarged in reciprocation for the continued admission into this country of articles from the countries referred to.

A splendid insight into the present work of the Department is given in Secretary Rusk's last report, an epitome of which appeared in our December issue. That report shows that while the present head of the Department has an enthusiastic perception of the needs and possibilities of this bureau, there is a tendency to magnify its politico-executive side, as well as its purely scientific work, to the partial exclusion of the improvement of its statistical division. Important as are these other functions of the United States Department of Agriculture, the development of its system of crop reports and collection of other statistical data should be widely extended. Not only that, but every facility should be called into play for disseminating the information thus obtained among producers and consumers who are to be benefited thereby. This will doubtless be done most effectively in connection with the distribution of the daily weather reports, which we hope to see brought within the reach of farmers everywhere in time to be of daily use, by a system of cheap telegraphing, frequent mails, and free delivery.

While the AMERICAN AGRICULTURIST has, in the past, duly honored the present Secretary of Agriculture, and many of the heads of the Department's divisions, several of whom contribute notable articles to the present issue, it is only proper to take advantage of this opportunity to recognize the efficiency and capacity displayed by the government statistician, Mr. J. R. Dodge. While not infallible, and of course, subject to criticism, Mr. Dodge developed, if, indeed, he did not originate, a system of crop reporting that commands the admiration of statisticians throughout the world. Had the means been provided to enable this work to be extended and improved with the recent rapid development of the country, it would be much more useful. Only those who appreciate the difficulties and inconveniences in this work can fully appreciate Mr. Dodge's services to the farmers of this and other countries.

Sap in Trees.—Wm. Higgins, Laurens Co., Ga.: The question: "Does the sap that is taken up by the roots of trees in the spring descend and go back and out through the roots into the soil in autumn" must be answered in the negative, for no such circulation or movement of the sap occurs in trees or other plants. It is true, perhaps, that there are still many persons who cling to the very old and erroneous idea that the sap descends to the roots of trees in winter, although the absurdity of this error or belief has been demonstrated hundreds, if not thousands of times, during the past three centuries. In an old work on forestry, published more than two hundred years ago, we read: "To think that the sap of trees at the approach of winter falleth from the head into the root is a gross mistake." When the warm weather in spring approaches, the roots absorb moisture from the earth and this flows upward through the cells, reaching the young leaves, buds, and twigs, where it is assimilated, a part passing off through the air, but that portion which has assimilated descends, and spreads out over the entire outward surface of every twig, and branch as well as the main stem and roots, depositing a thing film of albuminous matter which, in time, becomes an additional layer of cells, and this process is a continuous one throughout the growing season.

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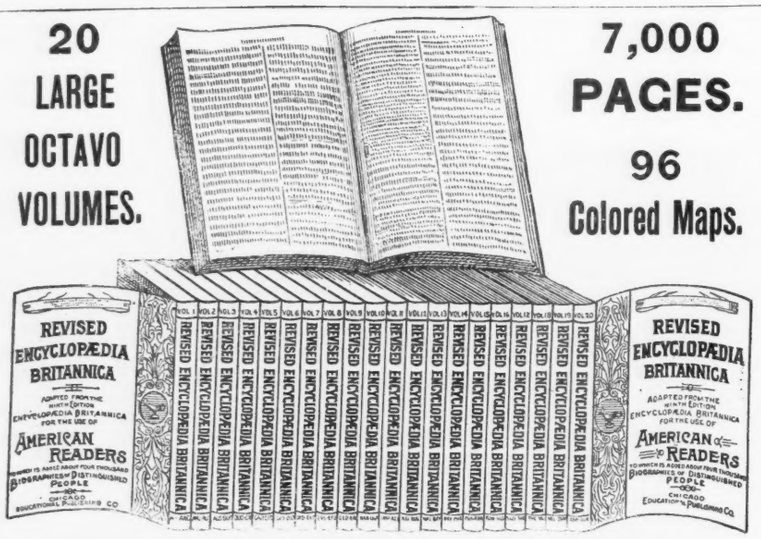

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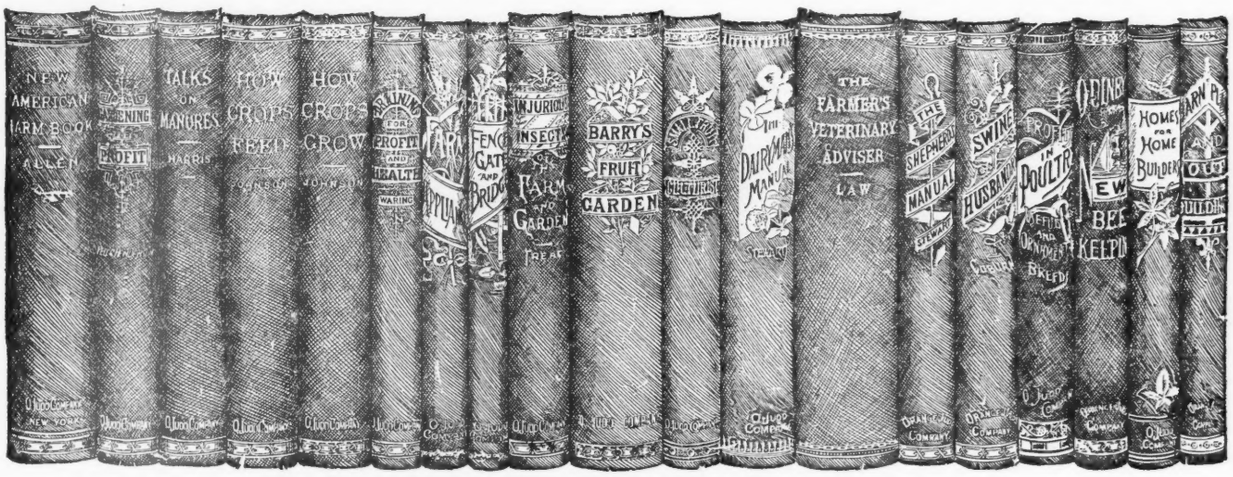

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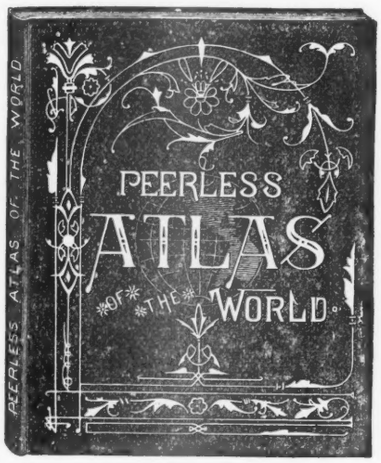

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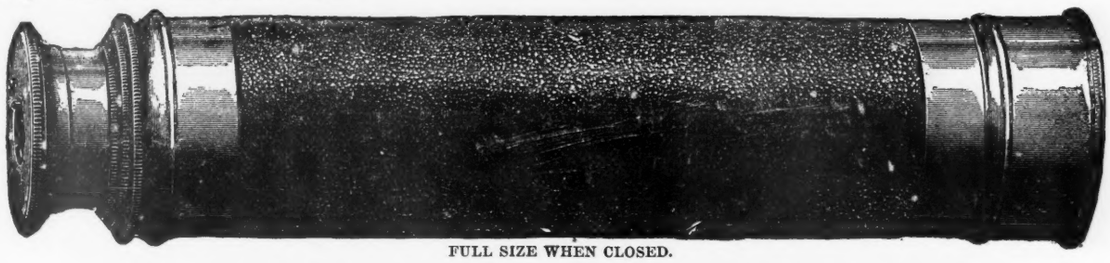

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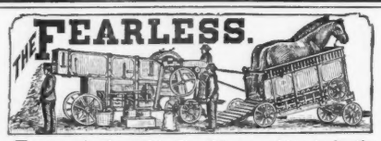

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